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BULLETIN OF THE

TAYLOR SOCIETY

A SOCIETY TO PROMOTE THE SCIENCE AND THE
ART OF ADMINISTRATION AND OF MANAGEMENT

CONTENTS

The Application of the Principles of Scientific Management to the Office

Apportioning Sales Overhead

A Footnote to Mutual Rating

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FEBRUARY, 1922 VOL. VII., NO. 1

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TAYLOR SOCIETY

A SOCIETY TO PROMOTE THE SCIENCE AND THE
ART OF ADMINISTRATION AND OF MANAGEMENT

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COMMENT

WE hope that readers will not fail to perceive the significance of the subdivisions of the paper, on another page, on the application of the principles of scientific management to the office. The subdivision captions emphasize what are the fundamentals of scientific management. (1) Control; planned and precise bringing together of the elements of production (whether the production of material goods, office services, sales or anything else), so that there will be the least waste of the elements (materials, labor energy, equipment, etc.); (2) The Establishment of Standards; standards of materials, equipment, methods and effort, so that control may assume definite reactions on which alone precise plans and expectations may be based; (3) Investigation and Research; to discover the *best* standards to be established and made available to control. Investigation and research discover not only what standard to adopt in the particular circumstances, but also what methods and mechanisms are most suitable for the development and maintenance of those standards; investigation and research also determine the methods and mechanisms most suitable for the utilization of these standards, that is, for the conduct of operations. These methods and mechanisms become the "system" of management. The above fundamentals constitute the principles of good management, applicable to any enterprise.

IN the preceding issue of the BULLETIN, in editorial comment on Cecil Pigou's article, we made the observation that joint attack by executives on the problems of the economic environment (problems imposed by forces which restrict the opportunities for good management in the individual plant) is as practical a matter, and as much an administration and managerial responsibility, as is an attack on problems within the individual plant. Some executives do not agree with us. They seem to premise the reasoning which leads to their disagreement with the assumption that these environmental forces are "economic laws," natural and changeless, interesting for "theorists," but not worthy the attention of "practical" men. In an address recently before the National Agricultural Conference, Wesley C. Mitchell made some observations, according to press reports, which constitute a reply to and should command the respectful attention of these executives. These observations were to the effect that "economic laws" are but man-made generalizations concerning the behavior of men in their economic activities; the behavior comes first and the laws follow; if the behavior changes, the laws change. Of course, men in the mass do not change their beliefs, ideals and habits easily, but they can effect some degree of change if they will to do so. If they join in modification of their economic behavior (administrative and managerial policies and methods), executives can modify, and in the long run change, "economic laws." When one speaks of the "new economics," as one frequently does, one means simply that generalizations based on an earlier behavior are no longer reliable; that behavior is changing and generalizations must be modified to conform to a new behavior.

THE APPLICATION OF THE PRINCIPLES OF SCIENTIFIC MANAGEMENT TO THE OFFICE[1]

AS EXEMPLIFIED IN A FACTORY OFFICE, A DEPARTMENT STORE AND A BANK

William Henry Leffingwell[2]

I. INTRODUCTION

1. THE OFFICE

The office is that part of an enterprise devoted to the direction and coordination of the various activities of the enterprise; and is characterized by the gathering, classification and preservation of data of all sorts; the making, using and preservation of all kinds of records; the analysis and utilization of these data in planning, executing and determining the results of operation; the preparation, issuing and preservation of instructions and orders; and the composition, copying and filing of written messages.

THE office and office management have undergone a more striking change during the last forty years than has manufacturing. Though many changes in manufacturing have taken place, the purpose and technique of manufacturing still remain much what they were at the beginning of the present economic system. The purpose of the office, however, has grown far beyond its original scope, so far indeed that the original purpose is almost forgotten.

Formerly the office kept only financial records—records of amounts owed and owing. Today the office is the master planning department of an enterprise and in some lines is so intricately bound up with operations as to make it impossible to separate the office from the operating.

The growth of the importance of the office may be shown by the increase in the number of workers engaged in the manufacture of typewriters, adding machines and other office supplies and equipment. In 1880 there were but eight such workers to every million inhabitants; in 1910 there were 240, a relative thirty-fold increase, and an absolute fifty-five-fold increase.

From records of amounts owed and owing, the scope of the office was first enlarged to cover records of agreements, correspondence, and analyses of profits and losses. Later, elements of direction and coordination were added. Today the office is really the master planning department of an enterprise.

It is significant that the engineers who developed planning in the factory should have turned to the devices of the offices for their tools, and that the office managers, all unconscious that the office is a planning and coordinating department, should have ignored the intensive application of these devices and methods to planning their own planning.

2. OFFICE TYPES MORE COMPLEX THAN MANUFACTURING

Management engineers have classified manufacturing operations as either (1) contractual, (2) repetitive or (3) continuous. It seems impossible to apply any such classification to office operations as in almost every office these three kinds of production methods are found as major functions. The handling of correspondence, for example, may be likened to contractual or jobbing production; although as in jobbing many elements are like, each letter requires individual treatment. Many operations in the sales department are distinctly repetitive. The handling of orders or other similar routines may be likened to continuous production. In one respect, however, the office differs from the factory: while, for instance, an automobile manufacturing plant has almost totally different machinery from a paper mill, a bank uses tools almost identical with a mail-order house. The tools of all kinds of offices are similar even if the products are different.

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[1] A paper presented at a meeting of the Taylor Society, New York, Dec. 2, 1921.

[2] President, The Leffingwell-Ream Company, Management Engineers, New York and Chicago.

3. PRINCIPLES AND MECHANISMS OF SCIENTIFIC MANAGEMENT

Scientific management may be briefly described as the application of the highest degree of coordination and control on the basis of scientifically determined standards of policies, materials, equipment, tools and methods.

In the practice of their profession, management engineers have developed certain standard methods and mechanisms. These mechanisms are the outstanding concrete evidence that something has been changed, but the mechanisms themselves are not scientific management. Carl Barth has said:[1] "It may be well to mention here that Doctor Taylor himself, some fifteen years ago, in warning a group of men against mistaking his details and mechanisms for essentials as against the principles of which they were merely an expression, made the prediction that ten years from then, not a single one of these details was likely to be in existence; and while this has not fully come to pass, it is true, that, for instance, I myself, have hardly left any of them untouched . . ."

The writer, therefore, with ample precedent, feels it necessary to urge the reader to ignore the mechanisms here described except as they are illustrative of the application of scientific management principles. Imitated mechanisms are usually worthless. For instance, some two or three years ago we developed a more scientific method of regulating and controlling production in the stenographic department of one of our clients. The head of that department in a lecture before office managers described the method and to illustrate the manner in which we measured the output, displayed the transparent celluloid scale used by us. This concrete object attracted attention at once. The lecture was printed in a business magazine. As a result of this lecture we received orders for over a hundred of the scales; but strangely we have never heard of even one conspicuous example of high production as a result of its use. These devices alone could not produce the result, and it is quite likely that there are a large proportion of these companies who claim to have "tried" scientific management in the office and found it worthless.

The application of the principles of scientific management to the office involves in most cases a radical departure from the shop mechanisms of the Taylor system, but we have found that some of the mechanisms and *all of the principles* behind the standard shop mechanisms are essential to good office management.

4. THE APPROACH TO THE OFFICE PROBLEM

The analytical approach to almost any office problem is precisely the same as it would be in the factory. The management engineer practicing in the office, however, will find generally an entirely different type of person to deal with, whether he be clerk or executive. Clerks are more sensitive than factory workers. They more quickly resent any inquiry into the amount of work they do. They work by the week or month on a salary, not by the hour or piece on wages. Wages in the factory are a matter of known rates applicable to groups; in most offices an attempt is made to keep salaries secret. Every effort has been made in the past to make a caste of office workers. The engineer in the office will come closely in contact with more temperamental, snap-judgment executives than usually will be found in factories where the executives have had contact with physical things and physical laws. The engineer finds more problems which seem to make analysis difficult, when dealing with documents, records, routines and the operations in connection with them than when dealing with more material things.

5. TYPES OF OFFICES REFERRED TO IN THE PAPER

To illustrate the various sorts of problems encountered in applying scientific management principles to the office we give examples in three distinct types of office—the office of a manufacturing plant, the office of a department store and the office of a bank.[1]

a. Manufacturing Plant Office. The office dealt with specifically is the office of a manufacturing company in Massachusetts. This firm may be classified as textile. In this factory scientific management has been developed throughout the shops by Taylor men and is considered an outstanding example of the application of Taylor methods. The office consists of two parts; the sales, order and correspondence division, and the planning department. Our work has been concerned mainly with the sales office, but the same methods of analysis are now being applied to the factory planning office with similar results.

b. Department Store. This is a store in the Thirtyfourth Street district of New York. In a department store, the purely clerical operation are comparatively few, but practically every operation is semi-clerical in its nature.

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[1] Foreword to *The Taylor System in Franklin Management*, by George D. Babcock.

[1] We are pleased to say that all of our remarks have first been approved by these clients before being presented in this paper. In view of the fact, however, that our work is necessarily of a confidential nature, we have omitted names.

c. The Bank. This is a trust company and bank in the downtown district of New York. In a bank or trust company practically all operations are clerical, semi-clerical or administrative, and the clerical work is so bound up with general operations as to make it practically impossible to separate one from the other. The problem therefore, is to apply scientific management principles to the whole business.

6. THE DEVELOPMENT OF SCIENTIFIC MANAGEMENT A COOPERATIVE EFFORT

It must not be thought that everything mentioned in this paper is a result solely of the direct work of the writer and his associates. In fact, one of the greatest results of scientific management is that it arouses, on the part not only of executives but also of employees, a greater interest in good management than existed before. Suggestions, ideas, new methods, greater interest, greater cooperation follow as a natural course. Many members of the organizations of our clients have had a part in the accomplishments. The most we can claim is to have instituted and taught scientific methods; to have formed in each organization a small group of students who assisted in the development of the work and who will carry it on after we have finished our preliminary steps.[1]

7. PLAN OF THE PAPER

No attempt has been made to describe the work chronologically. This would have served no good purpose. Neither have we listed all of the accomplishments in each place. We have, rather, endeavored to cover the subject in a logical manner, dividing it into five broad phases:

I. Planning and Control;
II. Standardization, the basis of Planning and Control;
III. Investigation and Research, the basis of Standardization;
IV. Inspection and Maintenance of Quality;
V. Scientific Office Arrangement.

II. PLANNING AND CONTROL

1. CASUAL PLANNING AND CONTROL ALWAYS PRESENT

We have described scientific management as being "the application of the highest degree of coordination and control by the use of scientifically determined standards of policies, material, equipment, tools and methods." It would be difficult to find an organization without any planning or control; it always exists to a greater or lesser degree. But rarely is this planning and control scientific; it is usually the result of years of growth and a process of casual selection of imitated methods. Effective planning of any kind involves a more or less exact knowledge of what is to be done. Control, as the word is used by management engineers, signifies that a routine has been established to insure that what has been planned is done as it was originally planned. It is needless to remind those present that we do not refer to what is commonly understood as control (authority), neither do we wish to imply that such control of operations is entirely absent. It cannot be said that planning and control methods have been developed where none existed before, but rather that methods already in existence have been improved or that new methods which are superior to the old ones have been substituted, and that these improvements or inventions are the result of the application of certain definite principles.

It may be well to mention that there is a difference between the control methods of a factory and those of an office. Inasmuch as, in most instances, factory planning, preparation and scheduling usually cover batches of similar work, rather definite and precise control is possible. Even in most jobbing work, the value of the job is sufficient to stand the expense of the necessary individual job planning. In office work, however, because the unit tasks are so varied, small and inexpensive in themselves, the business cannot stand the expense of individual task control, and it would be folly in most cases to plan precisely the work to be done before it is started; though, of course, the law of averages enables certain broad preplanning to be done. The planning in other words must usually be general and not specific.

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[1] "I feel strongly that work of any account, in order to be done rightly, should be done through cooperation, rather than through the individual effort of any one man; and, in fact, I should feel rather ashamed of any achievement in which I attempted to do the whole thing myself." (Frederick W. Taylor, *Engineering News*, 1907.)

Specific mention should be made of the following persons who have cooperated with us in the work here outlined: J. S. Beer,* W. T. Birdsall, R. G. Forbes, C. C. Hawley, W. W. Kirk,* N. L. McCully,* J. O'Connor, Paul M. Quattlander,* R. F. Riblet,* Louis Stewart, Jr.,* J. A. Valentine.* Our own engineers who have contributed to the work covered in this paper are C. W. Griffin,* Warren D. Bruner,* S. E. Goltra,* E. Franklin.* H. F. Jones* and Francis Goodell.*

* *Members of the Taylor Society.*

However, knowledge of work that has been done, exact knowledge of the practical capacity of a department or of an individual, complete performance records of past and current volumes of business done, expressed in work units, offer a control method of which advantage is rarely taken.

It is these essential things of planning that are neglected in the usual office.

Without this knowledge, there can be little preparation. The manager goes blithely on giving assignments, and executives, sub-executives and workers accept them without any knowledge of the amount given, or any attempt to stop the steady flow. The latest assignment given usually gets immediate attention, and those forgotten by the manager for the moment are neglected, only to be remembered when it is too late to get them done on time.

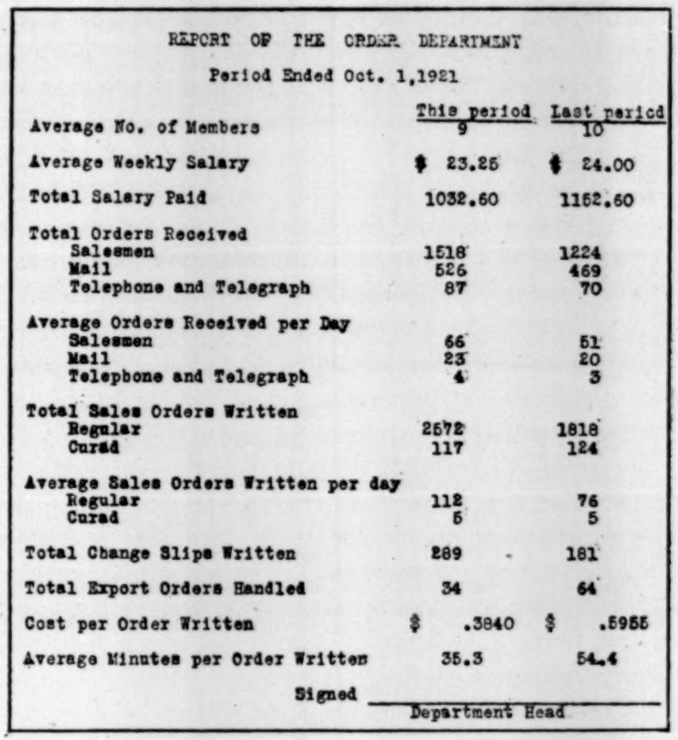
Without this knowledge there can be no scheduling of work in relation to its importance, or to the amount of time required.

The first step in getting such knowledge is the establishment of records of accomplishment which give a basis for control. Control records must be based upon some controlling unit, such as orders or transactions. Accomplishment records must not be considered in figures of time and pieces, but in their relation or ratio to the controlling unit.

2. THE FACTORY OFFICE

In this case we found records showing both the number of orders received and the volume in money and yardage; but while the use was made of these data by both the sales department and the manufacturing department, no use was made of them by the office for determining the total amount of clerical work to be performed. We made the order the controlling unit, for it was evident that most of the clerical work in the office depended neither upon the volume of sales nor the yardage, but upon the *number of orders*. We determined by reference to previous records that the average number of orders received per day was 100. We then calculated the number of clerical minutes, using only the clerks whose work was influenced by the number of orders received, and found that 36 clerks used 450 minutes each, or a total of 16,200 clerical minutes to handle 100 orders. Dividing the total clerical minutes by the number of orders handled, we learned that the average number of clerical minutes per order was 162. As it was incomprehensible that an average order would require 162 minutes to perform all the operations involved, this furnished us a basis for further investigation, which will be taken up later.

Executive control reports were then prepared. These are now issued monthly by each division of the office. (See Figure 1).



REPORT OF THE ORDER DEPARTMENT

Period Ended Oct. 1,1921

	This period	Last period
Average No. of Members	9	10
Average Weekly Salary	$ 23.25	$ 24.00
Total Salary Paid	1032.60	1152.60
Total Orders Received		
Salesmen	1518	1224
Mail	526	469
Telephone and Telegraph	87	70
Average Orders Received per Day		
Salesmen	66	51
Mail	23	20
Telephone and Telegraph	4	3
Total Sales Orders Written		
Regular	2572	1818
Curad	117	124
Average Sales Orders Written per day		
Regular	112	76
Curad	5	5
Total Change Slips Written	289	181
Total Export Orders Handled	34	64
Cost per Order Written	$ .3840	$ .5955
Average Minutes per Order Written	35.3	54.4

Signed ______________
Department Head

Fig. 1. Executive Control Report.

It will be noticed that the number of clerical minutes per order is shown. By comparison with previous months, the management shows exactly how much work is being performed and its relation to the volume of orders. This furnishes a control which did not exist before.

3. THE DEPARTMENT STORE

Most department stores are well supplied with control records concerned with finances, expenses and movement of merchandise. The store in question had a very complete set of records of this sort, but its records of the volume of work per individual were inadequate.

The first step was to establish a controlling unit. It is an almost universal custom in department stores to speak of the ratio of expense to sales in dollars. So general is this practice that it required a great deal of persuasion to get all concerned to see that the dollar is not a stable unit, and that the expense percentage is bound to fluctuate with the other fluctuations of prices, other things remaining the same. A rising market led this store, as it must have led countless others during the recent active period, to believe that they were holding the ratio of expenses down. When, however, the individual transaction was taken as a unit, and the expense of handling a transaction was considered, it was found that many departments with a low expense ratio were actually operating at a greater cost per transaction than the rise in wages and other expenses would justify. Department managers, themselves deceived by the low expense ratio, had felt that they need no longer economize so severely and asked for additional help. The exact records of the management as to the number of transactions, showed that instead a decrease in help was desirable, and in practically every case a reduction was made when an increase was asked for. Results proved that this policy did not in any respect reduce sales, but it did compel closer attention to management upon the part of the executives. The publication in the store of statistics concerning the number of transactions got every departmental executive immediately interested in reducing the cost per transaction. This knowledge enabled the management to control the situation in a manner it had never before done. The result was a saving of many thousands of dollars a year.

The knowledge of things done and to be done was gradually perfected. A most complete set of executive control reports was prepared, covering each activity of the business. These reports are prepared by the department head himself, to bring forcibly to *his* attention the exact current conditions. (See Fig. 2.)

There are now issued monthly for the General Manager, forty-one of these reports. They are comparative with the previous year and the year to date, and in addition an estimate of the next month is included. These reports are digested for the management (the exception principle) and any striking or exceptional differences are noted. This too furnishes a better control than existed before.

The merchandising department improved its control by establishing quotas for each buyer and showing graphically from day to day the relative standing of each buyer. Since the establishment of this graphic board there has been marked improvement in almost all departments. (See Figure 3.)

In the bookkeeping department the seventeen ledgers, kept by hand, were found to be practically never in balance. Statements were sent to customers on the fifth or sixth of the month only with great difficulty. It was many times suggested by executives that the installation of machine bookkeeping would correct this difficulty, but we insisted that first many obvious defects in management must be corrected (standardization of conditions and methods); otherwise any machine method would fail just as did the hand method.

MONTHLY REPORT

Department: PERSONNEL DIVISION
(Including Employment: Training, Rating/Timekeeping and Statistical Sections)
Month:

FOR THE YEAR TO DATE	THIS YEAR	LAST YEAR	ESTIMATED NEXT MONTH
Average number of members			
Number of latenesses			
Percentage of latenesses			
Overtime paid			
Average weekly salary			
Total salaries paid			
Number of members on hand beginning of year			
Number of new members engaged			
Number of members withdrawn			
Number of members on hand end ot period			
Turnover percentage			
Number of transfers			
Number of applicants interviewed			
Number of new members instructed			
Number of old members instructed			
Number of special class meetings			
Number of errors recorded (Selling)			
Number of errors recorded (Non-Selling)			
Number of errors percentage			
Number of lates recorded (Selling)			
Number of lates recoeded (Non-Selling)			
Number of late percentage			
Number of absence recoeded (Selling)			
Number of absence recorded (Non-Selling)			
Number of percentage of absence			
Number of interviews with members			
Number of interviews with Dept. Heads and Assistants			
Number of interviews with others			
Total interviews			

Fig. 2. Executive Control Report.

A system of monthly posting of charges and daily posting of credits was in vogue. Daily the sales checks were entered on a statement, and at the end of the month the net totals were posted to the individual accounts. It is evident that a control of conditions at the end of the month involved daily control of the work. Graphic charts were developed to show when each statement clerk and bookkeeper finished the work scheduled for the day. Photostats of this chart taken on the same day of each month showed a constant improvement as a result of this control. Statements are now ready for mailing to customers regularly on the last day of each month, with not only less effort on the part of both clerks and management but with actually fewer clerks than before.

Similar charting methods are used in a number of different departments of the store, with similar results; so they need not be detailed.

In a factory, where most workers have or can have well-defined jobs, it is a comparatively simple matter to measure the value of a worker by the quantity and quality of his product. In an office, however, the work

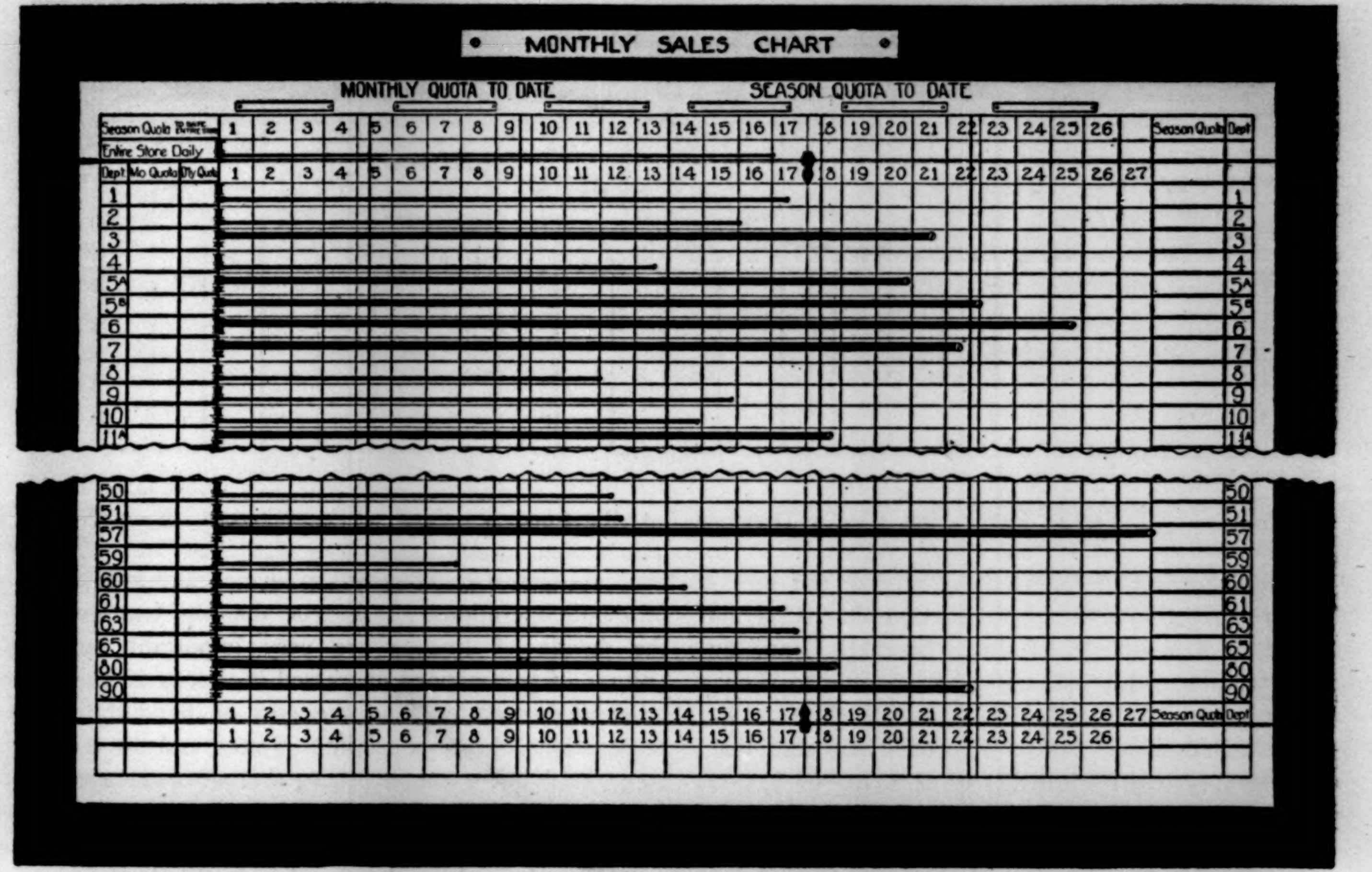


Fig. 3. Sketch (from photograph) of Graphical Control Board.

Description of Figure 3. The chart accommodates eighty departments. On the left side is the department number, the monthly quota, and the daily quota. On the extreme right, beyond the ruling, is the seasonal quota and the department number. On the head and foot of the chart are two scales, one for the seasonal days divided into twenty-six weeks, the other for the days of the month for the maximum of twenty-seven. The ruling of the chart is by days, which are divided into tenths; and at every interval of four or six weeks is a heavy line signifying the month. At the top and bottom of the chart are sliding arrows signifying the number of working days for which the chart was set up. There are also two spaces, one at the top and one at the bottom, to show the progress of the entire store. The whole set-up is eleven feet high and seven and one-half feet broad, making a massive score-board effect. It has been in use for four months and thus far has created great interest; which, of course, is its main purpose.

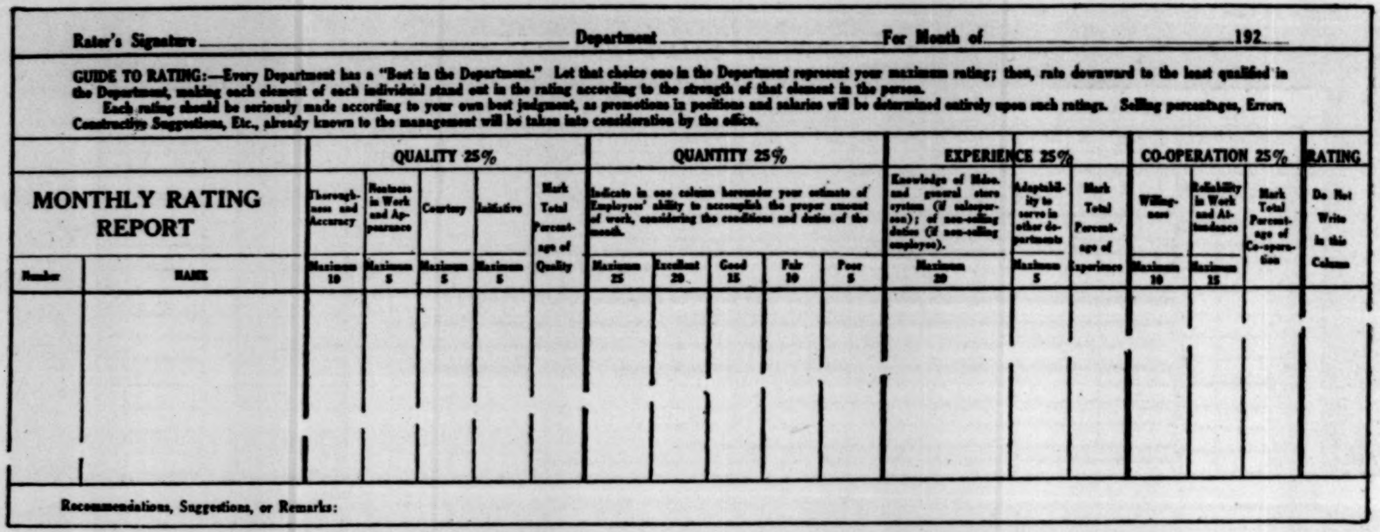
is not usually well-defined and often cannot be defined in terms of output. Need is felt, therefore, for a plan of general rating.

The following rating system originally suggested by John Leitch, author of "Man to Man," and developed to its present state by the General Superintendent's office, gives a monthly rating of each employee. Employees are rated as follows:

Quality 25	Accuracy Neatness	10 5
Quantity 25	Courtesy Initiative	5 5
Experience 25	Knowledge Adaptability	20 5
Cooperation 25	Willingness Reliability	10 15

This rating plan is used to determine the base rates of salaries and as a guide to promotions. (See Fig. 4.)

A Personnel Division was established, with responsibility for the following departments: Employment, Training, Rating, Statistical, Timekeeping, Employees' Restaurant, Hospital, House Organ. A statistical office was organized in the Superintendent's Office, where all personnel statistics are centralized; references, applications, employees' accounts, payrolls, ratings, monthly reports, timekeeping records, insurance, etc. These operations were formerly distributed over five or six different offices. Consolidation and better functioning resulted in a saving of one-third the former cost of doing this work.



Rater's Signature ______ Department ______ For Month of ______ 192__

GUIDE TO RATING:—Every Department has a "Best in the Department." Let that choice one in the Department represent your maximum rating; then, rate downward to the least qualified in the Department, making each element of each individual stand out in the rating according to the strength of that element in the person.

Each rating should be seriously made according to your own best judgment, as promotions in positions and salaries will be determined entirely upon such ratings. Selling percentages, Errors, Constructive Suggestions, Etc., already known to the management will be taken into consideration by the office.

		QUALITY 25%					QUANTITY 25%					EXPERIENCE 25%			CO-OPERATION 25%			RATING
MONTHLY RATING REPORT		Thoroughness and Accuracy	Neatness in Work and Appearance	Courtesy	Initiative	Mark Total Percentage of Quality	Indicate in one column hereunder your estimate of Employees' ability to accomplish the proper amount of work, considering the conditions and duties of the month.					Knowledge of Mdse. and general store system (if salesperson); of non-selling duties (if non-selling employee).	Adaptability to serve in other departments	Mark Total Percentage of Experience	Willingness	Reliability in Work and Attendance	Mark Total Percentage of Co-operation	Do Not Write in this Column
Number	NAME	Maximum 10	Maximum 5	Maximum 5	Maximum 5		Maximum 25	Excellent 20	Good 15	Fair 10	Poor 5	Maximum 20	Maximum 5		Maximum 10	Maximum 15		

Recommendations, Suggestions, or Remarks:

Fig. 4. Rating Plan, Used to Determine Base Rates and as a Guide to Promotions.

Time recorders were installed, making not only a twenty-five per cent saving in timekeeping costs, but furnishing a payroll which could be checked and audited perfectly; this had not been possible to such a degree before.

One old-fashioned method of control was eliminated and a new system instituted, with a saving of $75,000 a year.

A daily expense and sales budget was inaugurated which enabled the management to know from day to day what sales and expenses would be for the month and season.

Records of absences and tardiness and monthly ratings by departments were instituted. Whereas formerely there were nearly ten per cent of lates, this has been reduced to one-half of one per cent. Absent time formerly cost the store $1,500 a week; it now costs about $125.

By careful records of employees' errors and analysis of the probable cause, the average percentage of errors was reduced from about three per cent to seven-tenths of one per cent, a very low rate indeed. These records are published monthly in the company's house organ by departments.

A control conference board was established in the Superintendent's office, through which all new projects are cleared and a definite follow-up system carefully maintained.

4. THE BANK

Although all banks have a very precise control over money and securities, there is one condition peculiar to banking which does not exist in any other line of business. The biggest and most influential men in the bank are primarily interested in finance; not in methods of detail operations. It is true that the handling of the details of finance are very important, but the volume of transactions expressed in money is so overwhelmingly greater than the cost of handling these transactions, the responsibility so keen and the tension so great, that it is not surprising that office management has not been given the attention it has received in other types of organization.

The work we have done to date in this bank has to a large extent dealt with physical things. While we have devoted a certain amount of time to clerical operations, we do not feel that this work has progressed far enough to enable us to speak of it as definitely accomplished. Nevertheless, we shall suggest a number of lines for possible work; some of these have been commenced and gratifying progress made; on others we are merely outlining what our analysis in this bank and experience in other institutions show is distinctly possible.

Nearly all of the banks whose organizations we have been privileged to examine have not been functionalized. There are usually a number of officers not definitely assigned. It is an open question whether or not they should be; but in the opinion of the writer there is no question whether some one officer should be assigned to what has been called administration, or the general supervision over all clerical operations.

This function should be subdivided into administrative control (the establishing of internal policies and standards), and office management (the charge of the direct performance of routine in accordance with those policies and standards).

We would suggest the establishment, first, of divisional executive reports similar to those used in the department store. It is likely that in the beginning no one controlling unit, such as the transaction in the department store or the order in the factory office, could be found; but certainly divisional control units, such as *the item* in the bookkeeping division, or the *letter* or *square inch* in the stenographic division, could be found. Certainly the crudest kind of an output record would show up startling differences in individuals. Analysis of actual conditions would then show whether those with the high records are exceptional persons. Another thing these records would show, is whether the force in a division is adequate to handle the work given. The divisional head, studying these reports as he makes them out, will not be likely to ask for additional help if by their aid he himself discovers short cuts or improved methods.

Some banks have budgets of operating expenses. From a study of these budgets we have seen that there are great opportunities for improvement along scientific lines. When a budget is indefinite it ceases to have much value. The more finely a budget can be divided (within reason), the more likely it is to result in reduction of expenses.

There are some activities in trust department work which can be planned through a planning department corresponding exactly to a factory planning department under the Taylor System. A trust department does a great many things such as to collect rent, dividends, interest, and so forth. Why not establish a central planning section, make all of the activities to be performed on any specific trust, a part of a master work order and give assignments as they are due to be performed? When the activity has been completed this assignment can be returned to the central planning section and checked against the master work order.

5. SPECIAL FEATURES OF CONTROL IN THE OFFICE

In each office mentioned control is really in the early development stage, but in each the work has progressed far enough to show the necessity for some reliable basis for control. That basis is standardization.

There are few offices which permit of planning in one central room; therefore, rather than forego the advantages of planning, it has been our practice to establish planning sections, first in the main divisions of a business, later loosely combining them in one central planning conference board. The actual planning remains with the individual sections, but the conference board finally passes on all standards and the manner of establishing them.

In none of the three offices mentioned will it be possible to have central planning of the same kind as is found in most factories operating under the Taylor methods. In the factory office the planning will be divided into at least two sections. In the department store it is at present divided into three, and may later be extended to four. In the bank there will be at least two, and possibly three, divisions of the planning.

III. STANDARDIZATION THE BASIS OF PLANNING AND CONTROL

1. STANDARDIZATION PROGRESSIVE

Standardization is never complete. Standards established in one division demand standards in another. So the work goes on, growing more and more perfect. The standardization covered in this paper includes policies, methods, equipment, and tools; but naturally the work has not progressed far enough in each office to show examples of standards in each of these things in all offices. The fact that it has been possible to standardize them, however, is sufficient to establish the fact that standardization is of great value in office work.

It may be assumed that standardization in the office is accomplished in practically the same manner as it is in the factory. First, an analysis is made of conditions; this shows imperfections in the method. Second, a better method is devised; this may or may not involve extended research and investigation. Third, the new method is made standard practice, described in writing and taught to the workers.

2. STANDARDIZATION IN THE FACTORY OFFICE

Thus far the work has not progressed far enough in this office to cover much standardization. Most of that is yet to be done. The standardization of credit policies, which is now in process, however, will have a far reaching effect not only upon the volume of work to be performed, but upon the business methods of the company. These policies as they are formulated have not only the approval of the credit manager, but also of the sales manager and the general manager. Thus the credit policy becomes a company policy; not merely that of the credit manager, as it is in most companies.

One standard was adopted which in some larger companies would have had a startling effect. A study was made of all matter about to be filed. In the old days everything that came to the file clerk was filed, regardless of its value. This study showed that a very large percentage of matter has little or no future value.

The inevitable question was, Why file it? The following standard practice instruction was issued:

> With the hope of reducing the space and work required for the maintenance of general files, the following rules have been adopted:
>
> 1. No circular letters or advertising literature shall be sent to the general files.
>
> 2. The dictator's copy of the inter-office memoranda, except memoranda from branch offices, shall be the only copy which shall be filed in the general file, and then, only when in the opinion of the dictator there is a possibility of the memorandum having a future reference value. This means that the person receiving inter-office memoranda, except from branch offices, shall in no case send such memoranda to the general files.
>
> 3. Persons receiving correspondence from or sending correspondence to branch offices, shall send to the general files only that correspondence which, in such persons' opinion, may have a future reference value.
>
> 4. The general file clerk is instructed to destroy all memos, correspondence or other literature received for filing in violation of any of the preceding paragraphs.
>
> 5. Each executive receives and ordinarily files a considerable amount of material which has no future value in the files, but as a matter of routine and habit often goes into the files. Routine acknowledgment of payment and "Thank you" letters of various kinds are examples. These can just as well be destroyed when received. Judgment must be used and in doubtful cases the material should be filed; but by taking thought each executive can safely reduce to some extent the amount of material sent to the file.

As a result of these instructions, the amount of filing was reduced approximately twenty-five per cent, with a reduction in space, equipment and filing energy.

3. STANDARDIZATION IN THE DEPARTMENT STORE

Standardization in this store has proceeded much further than in either of the other institutions, and it will be possible to give, in our limited time, only a few typical examples.

One striking example was forced upon us as the result of a change of conditions. It becomes necessary to move the "Accounts Payable" division from one part of the building to another. A study of the new space allotted showed that there was not enough room for the department as organized and equipped. The bookkeepers were using high standing desks, six feet long. These huge desks were necessary because the books used were large and each bookkeeper used several. It was ncessary to use a standing desk because the bookkeeper actually had to walk a step or two from one end of a book to the other. A study of the books showed that nearly two-thirds of each sheet was blank paper. The sheet was re-designed, waste space eliminated (on the unit of space—the page), and as a result the books were reduced in weight sixty-two per cent and in size forty-four per cent. Low desks, size 60″ x 30″, were substituted for the huge standing desks, 72″ x 36″, and the department was easily moved into the allotted space.

Several clerical departments were consolidated and placed in one large room, and clerical tables of a special design were used instead of desks. These tables were designed at the time when office furniture was at its highest price. Instead of using the so-called standard office table, we had a substantial table made by a manufacturer of kitchen furniture, covered it with linoleum top, painted it green, and obtained a good-looking, serviceable table at a saving of about $30 a table. $30 x 150 tables equals a saving of $4,500 on this item alone. A miscellaneous collection of possibly a dozen different sizes and styles of tables and desks of various ages was junked at an actual saving, because the new arrangement occupied less space and gave better working conditions.

To give detailed explanation of the application of standardization in this store would require more time than is at our disposal. A brief list of the accomplishments, however, will be of interest and will show the wide field covered.

By analyzing the causes of complaints and endeavoring to eliminate those causes, by establishing standard methods, complaints were reduced forty-two per cent, with a consequent improvement in service. One cause alone responsible for 1,000 complaints a month was eliminated when the cause was discovered to be something easily corrected.

Changes in the layout, management and methods of the pneumatic tube room resulted in an improved service at a saving of approximately $18,000 a year.

In the delivery and returned goods room service was greatly improved by standardization and the cost reduced to $0.002 per transaction.

The packing department is handling seven and a half per cent less transactions with thirty-seven per cent less help, but improvements has only begun in this department. Much greater reductions are expected.

Standardization of forms enabled the store to eliminate ninety-three forms. Consolidation of forms meant also a reduction in the clerical work to be done thereon.

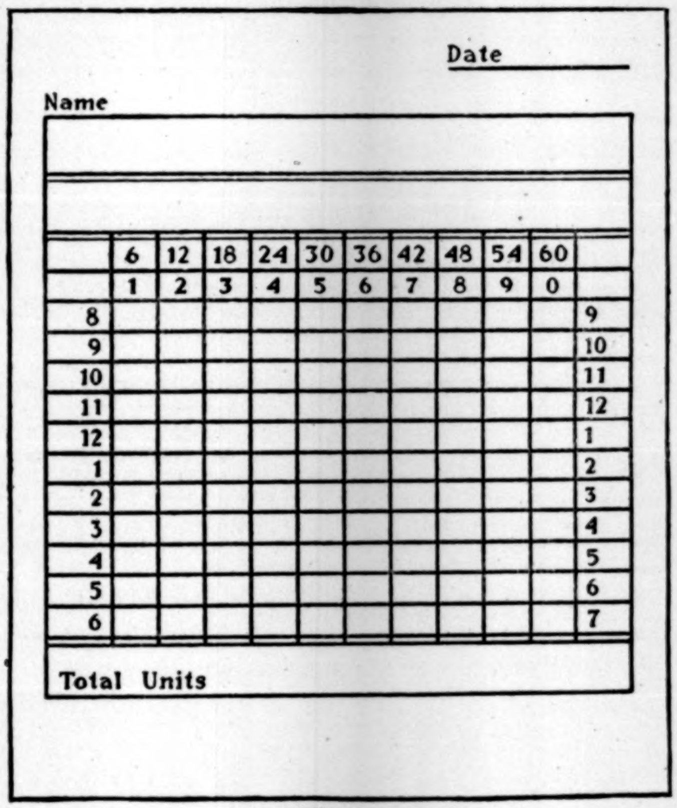
Standardization of mail opening resulted in increasing the output from 100 letters an hour to 240 letters an hour.

Standardization of billing resulted in a decrease of billing clerks from nineteen to thirteen. Hand bookkeepers have been reduced from thirty-one to twenty-five.

A decentralization of the adjustment office and a consolidation of the mail order, business promotion, correspondence and adjustment clerical offices resulted in an approximate saving of $35,000 a year.

In standardizing operations we have felt the need of a comparable method of compiling accomplishment records.

We have used the following method to determine the percentage of efficiency of workers performing standardized operations. This method does not require a great deal of figuring, and it enables one to compare the efficiency of one clerk with another, whether or not they happen to be engaged on similar work.



Date

Name

	6	12	18	24	30	36	42	48	54	60	
	1	2	3	4	5	6	7	8	9	0	
8											9
9											10
10											11
11											12
12											1
1											2
2											3
3											4
4											5
5											6
6											7
Total Units											

Fig. 5.

DEFINITIONS

Time Unit: A time unit is one hour. In an 8-hour working day there are, of course, eight time units.

Standardized Operations: Operations on which time studies have been made, and a standard production set, are called standardized operations. The bonus is paid only on standardized operations.

Unstandardized Operations: Operations which have not yet been studied, or which you consider not sufficiently important to study, are called unstandardized operations.

A Work Unit: A work unit **is the standard production** in one hour on an operation. For example, if Standard Number 1 is at the rate of 1,000 per hour, 1,000 is one work unit; 5,000 is five work units; and so on. If Standard Number 2 is only 500 per hour, then 5,000 is ten work units.

TO FIND THE RATE OF EFFICIENCY USE THE FOLLOWING RULES

1. One hour's production at the standard rate equals one work unit.

2. The actual production divided by the standard production per hour, equals the number of work units produced. For example: If 2,000 of Standard Number 1 are produced, and the rate on Standard 1 is 1,000 per hour, it is evident that two work units have been produced.

3. The number of work units produced, divided by the number of hours worked, or the time units, equals the percentage of average efficiency. For example: If the standard rate is 1,000 per hour, and 2,000 are performed in two hours, the method of figuring would be as follows:

Work units produced........... 2
— = 1 or 100%
Divided by time units worked.. 2

Or, take another example:

Work units produced........... 1
— = ½ or 50%
Divided by time units worked.. 2

Tables for Figuring Work Units Produced: In order that still more figuring may be eliminated, it is suggested that tables be prepared for different rates of production similar to the following:

STANDARD PRODUCTION PER HOUR

Work Units	*125*	*150*	*175*	*200*
.05	6	8	9	10
.10	13	15	18	20
.15	19	22	27	30
.20	25	30	36	40
.25	31	etc.	etc.	50
.30	37			etc.
.35	44			
.40	50			
.45	56			
.50	63			
.55	70			
.60	75			
	etc.			

Accounting for Unstandardized Work and Idle Time: Under this method it is unnecessary to account for any time except that spent on unstandardized operations, or in idleness; the balance, it is assumed, is spent on standardized work. For example, if an operator worked two time units—two hours—on unstandardized work, and was idle one-half time unit—one-half hour—while waiting for work, it is assumed that the balance of the day—five and one-half hours—was spent on standardized work. It makes no difference on how many different standardized operations the operator worked. The method shows exactly what her percentage of efficiency was.

Provide a slip of paper, similar to the attached sample, (Figure 5) for the operator when she begins an unstandardized operation.

This slip she takes to the head of the department, or some other person delegated for the purpose, who punches on this slip the hour the operator begins on the unstandardized work.

When the unstandardized work is finished, she again takes the slip to the head of the department and has it punched.

The space shown on the slip between the time the operator started on the work and the time she finishes in easily figured in tenths of an hour. One of these slips should be provided for each operator each day, to be turned in at night.

The operator should, herself, do the figuring of the number of tenths of hours, in order that this may not have to be done by some one else.

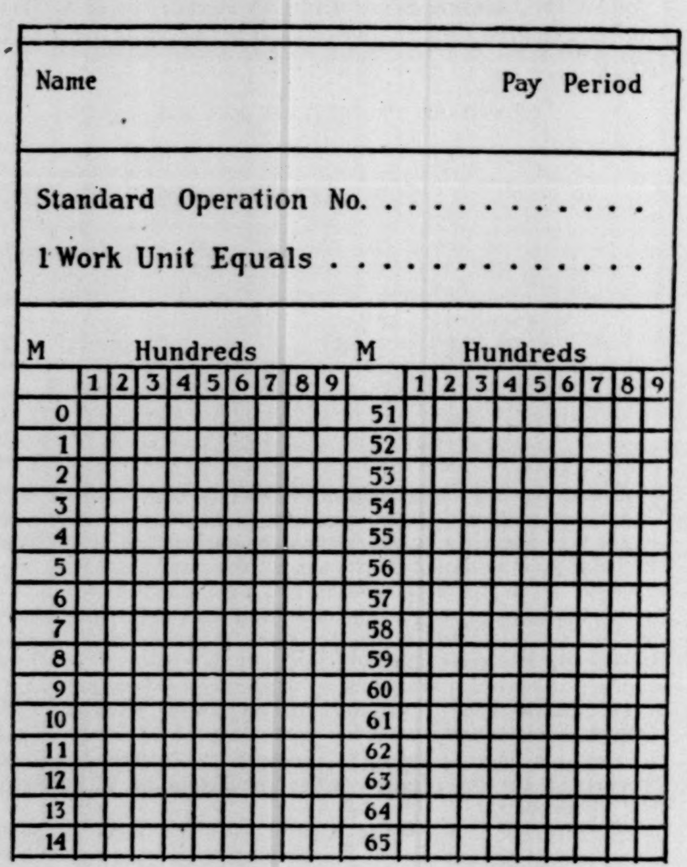
At the end of the pay period, these slips are totaled. The entire amount of time spent on unstandardized work and in idleness figured in time units, is deducted from the number of time units in the pay period. It is assumed that the balance represents the total time units spent on standardized operations.

Keeping Track of the Word Done: I suggest also that each operator be given a special slip printed with the amounts of work that may be given out—from the lowest quantity of work given at any one time, to the highest amount that can be produced in a pay period. (See Figure 6.) These slips are distributed to the operators at the beginning of the pay period and kept by them until the pay roll is to be made up.

When work is given to the operator, the new amount is added to the amount previously given, and the last figure therefore shows the total amount of work given to her up to that time.

In order that the operator may know at all times her percentage of efficiency, I suggest that a slip similar to the attached (see Figure 7) be given to each operator at the beginning of the pay period upon which she can record her daily time units and her daily output. The object of this record is to furnish a daily stimulus to the employee to maintain or beat her records.

The following method of figuring bonus payments is a combination—it consists partly of a modification of the Emerson graduated sliding scale, and partly of the differential piece rate.



Name **Pay Period**

Standard Operation No. . . . .

1 Work Unit Equals . . . .

M	Hundreds									M	Hundreds								
	1	2	3	4	5	6	7	8	9		1	2	3	4	5	6	7	8	9
0										51									
1										52									
2										53									
3										54									
4										55									
5										56									
6										57									
7										58									
8										59									
9										60									
10										61									
11										62									
12										63									
13										64									
14										65									

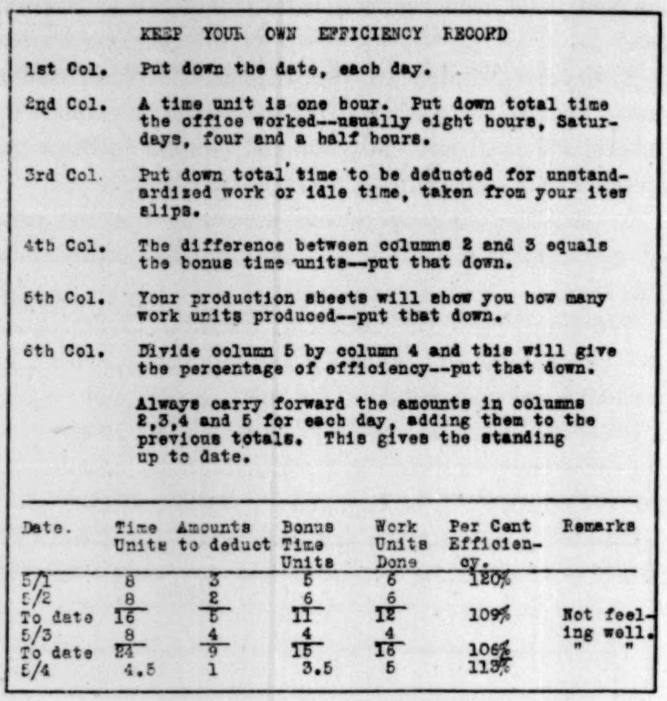
Fig. 6.

There is a good argument, I believe, in favor of this combination. While the Emerson system encourages the worker who is not 100% efficient and the differential piece rates does not, the Emerson curve runs to exorbitant figures after passing 100%. This necessitates the greatest care in setting the standard. An error is likely to be quite costly.

The method is as follows:

1. Determine the general average salary paid for this operation.

2. Determine the maximum amount the company is willing to pay for 100% efficiency. It is well to consider also the minimum amount of bonus which will be an incentive to the employee to reach 100%.



KEEP YOUR OWN EFFICIENCY RECORD

1st Col. Put down the date, each day.

2nd Col. A time unit is one hour. Put down total time the office worked--usually eight hours, Saturdays, four and a half hours.

3rd Col. Put down total time to be deducted for unstandardized work or idle time, taken from your item slips.

4th Col. The difference between columns 2 and 3 equals the bonus time units--put that down.

5th Col. Your production sheets will show you how many work units produced--put that down.

6th Col. Divide column 5 by column 4 and this will give the percentage of efficiency--put that down.

Always carry forward the amounts in columns 2,3,4 and 5 for each day, adding them to the previous totals. This gives the standing up to date.

Date.	Time Units	Amounts to deduct	Bonus Time Units	Work Units Done	Per Cent Efficiency.	Remarks
5/1	8	3	5	6	120%	
5/2	8	2	6	6		
To date	16	5	11	12	109%	Not feeling well.
5/3	8	4	4	4		
To date	24	9	15	16	106%	" "
5/4	4.5	1	3.5	5	113%	

Fig. 7. Individual Efficiency Record.

3. As you will see from the table, the bonus for 100% efficiency is 50% of the standard wage. Therefore the standard wage, plus 50%, should equal the maximum sum it is desired to pay for 100% efficiency. That is to say, the standard wage should be two-thirds of the maximum; and the bonus for 100% efficiency, one-third.

4. Establish a "Standard Salary" for an operation; that is to say, a sum of money upon which to figure the percentage of bonus. This sum as a rule closely approximates the general run of salaries paid for this operation, but does not necessarily do so. The only purpose of this standard salary is to figure bonus. It does not mean that if a clerk is already getting more or less than the standard policy, she is to be reduced or raised to the standard. The object of having a standard salary is to simplify the clerical work of figuring the bonus. It is still a further simplification to reduce this weekly or monthly figure to an hourly basis.

5. The following sliding scale is paid for from 68% to 100% efficiency.

% Efficiency	% Bonus	% Efficiency	% Bonus
67	0.0	84	13.
68	1.0	85	14.
69	1.4	86	15.
70	2.0	87	16.
71	2.8	88	17.
72	3.4	89	18.
73	4.4	90	20.
74	5.2	91	22.
75	6.0	92	24.
76	6.6	93	26.
77	7.2	94	28.
78	8.0	95	30.
79	8.8	96	32.
80	10.0	97	34.
81	10.4	98	36.
82	11.2	99	38.
83	12.	100	50.

On production above 100% efficiency, pay a bonus equivalent to the rate per piece at the 50% bonus. For example; suppose the standard salary is 20c an hour, and the standard production is 200 per hour. Assume that the clerk produces 300 per hour. The bonus would then be figured as follows:

50% of 20c is 10c, or the bonus paid for a production of 200 per hour. This is at the rate of 5c per hundred. If a clerk does 300 per hour, she gets a bonus of three times 5c or 15c per hour.

With this method the cost per piece is reduced as the quantity increases. Besides, the clerk gets adequate reward for increased efficiency.

A most important part of this work unit plan is our score board plan which is being developed. This plan, however, is too immature to dwell upon at the present; but the main idea is to compare the relative efficiency of one worker with another, no matter what kind of work is done, much as the average of a baseball player is figures and with the same purpose[1]—to arouse the spirit of emulation.

Standardizing the arrangement and methods of the receiving room resulted in decreasing the cost per package from $0.149 to $0.11.

Analysis of conditions and standardization of equipment in the basement store rooms, packing rooms, delivery rooms, and so forth, resulted in a saving of space amounting to 6,238 sq. ft., a reduction in personnel, and speedier handling of delivery.

Employment and training is being rapidly standardized with remarkable results. Though the store this year is handling seven and a half per cent fewer transactions, the personnel has been reduced approximately twenty per cent. The contingent force, for sales, is very definitely controlled. In a recent sale better service was given in a $75,000 day's sale with one-half of the force required the year previous to run a $45,000 sale.

4. STANDARDIZATION IN THE BANK

In studying the arrangement of the new bank it was learned that the equipment of the tellers in the cages is customarily built of metal to order. An analysis of the sizes of papers and other contents of drawers, shelves and compartments, showed that a standard unit bin system practically identical with the Taylor unit bin system was entirely feasible, and all metal equipment behind tellers' cages throughout the bank and in the vault was standardized in seven unit sizes, interchangeable everywhere. There is not likely to be expansion needed in any one teller's equipment, but each different kind of a teller requires a special combination. In the old way the moving of a teller from one cage to another required a rebuilding of the metal equipment. As the result of this standardization it will not be necessary to rebuild the equipment in future changes. This expensive operation has heretofore cost banks many thousands of dollars. A removal of the shelves or drawers is all that will now be necessary.

A standardized clerical table was devised, adjustable as to height, to fit the varying sizes of clerks, with adjustable foot rest, linoleum covered top, and specially designed drawer.

A special desk for bank bookkeeping was designed. The desk provides better working conditions in less space than was formerly used.

A special money sorting desk was designed.

All cages were fitted with a special device whereby messages may be handed into the cage or out of it without making it necessary for the messenger to enter the cage, also making it impossible for anyone to insert his hand.

Comparatively little has been accomplished in the standardization of routines or operations, but our analyses have shown there is a great field for this in the following departments.

Stenographers in banks are usually scattered throughout the organization. A central stenographic department will show an immediate increase in individual output.

Stenographers should not be given a miscellaneous lot of clerical work, for they are neither capable of handling it nor equipped for it.

Bookkeepers' work may be standardized.

Internal communication, such as messenger service, page boys, and telephone service may be organized and the work standardized. The work of the coupon paying department may be well standardized as it contains many repetitive tasks.

There are scores of operations in any bank which may easily be standardized with advantage.

It is natural for bank officers, whose training has been along lines foreign to engineering, to feel that "my business is different." Banking is loaded down with tradition. The younger element among bankers is smashing traditions and there is evidence that they will take advantage of the principle of standardization which has been demonstrated to be of value in so many industries. They are finding abundant opportunity not only for savings and increased profits, but for better organization which in turn means better service to customers. Banks are not slow to grasp the significance of service. To achieve the best in service requires the achievement of the best in methods.

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[1] Can a game be a game without scores? Can work be transformed to a game without comparative records?

IV. INVESTIGATION AND RESEARCH, THE BASIS OF STANDARDIZATION

How is standardization accomplished in the office? In precisely the same way as in any other institution. First, a study of the routine is made; then a study of the operation and possibly a study of documents and records. Finally, work methods are motion-studied, a definite task set, and usually a wage incentive applied.

1. INVESTIGATION IN THE FACTORY OFFICE

Analysis showed that 5,490 minutes (54.9 minutes per order) were used on operations directly connected with the order routine, and 10,710 minutes on other operations only indirectly related to the handling of orders. Still further analysis showed that the total actual time required to perform all operations directly connected with the orders was only 30.25 minutes. The actual net time required was found by taking time studies of a quantity of each operation, ignoring all interruptions or delays of an organizational character. This investigation showed, without question, that on the direct operations 24.65 minutes of time were being wasted or lost, and furthermore, exactly where it was being lost. It disclosed the following things:

A. There was not an even flow of the work;
  Caused by:
  - a. Irregular division of operations
  - b. Work being passed on in uneven quantities.
  - c. Two "necks" holding up work.

B. There were daily periods of idleness of short duration which passed unnoticed by the management.

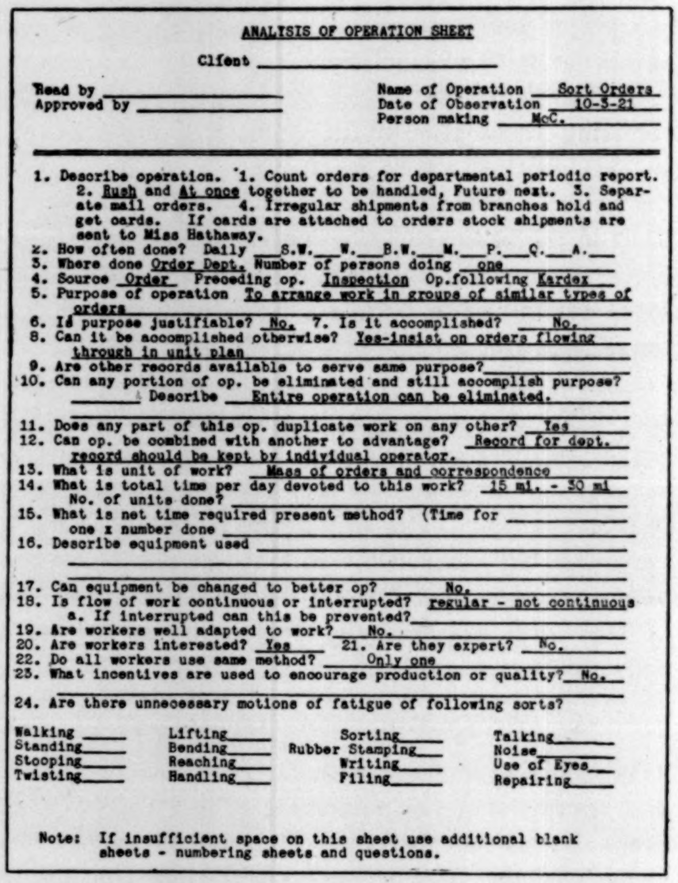
As a direct result of the preliminary analysis of the order routine alone, three clerks out of a total of ten were saved, without in any way changing the methods.

Analysis of the operations showed that some were absorbing much more time than seemed necessary. For example, every order had to pass through the credit department and be passed upon by the credit manager, in spite of the obvious fact that many were from responsible firms with old established credit ratings. Operating upon the exception principle, the credit limits of those whose credit was known by experience to be satisfactory was marked upon the customer's card. This plan not only put the order through the routine more rapidly, but allowed more time for the credit department to do its work properly on the cases which required its attention.

This analysis showed also that orders were passing through the routine in uneven quantities. This great source of delay and lost time was immediately eliminated by so arranging the desks that orders passed from one clerk to another one at a time, instead of in batches, effecting practically continuous production.

Considering all changes made in the routine handling of orders, there was a total saving of eight clerks out of thirty-six, a saving of twenty-two per cent.

A form used to analyze an operation is shown herewith (See Figure 8).



ANALYSIS OF OPERATION SHEET

Client ____________

Read by ____________
Approved by ____________

Name of Operation Sort Orders
Date of Observation 10-3-21
Person making McC.

1. Describe operation. 1. Count orders for departmental periodic report. 2. Rush and At once together to be handled, Future next. 3. Separate mail orders. 4. Irregular shipments from branches hold and get cards. If cards are attached to orders stock shipments are sent to Miss Hathaway.
2. How often done? Daily ___ S.W. ___ W. ___ B.W. ___ M. ___ P. ___ Q. ___ A. ___
3. Where done Order Dept. Number of persons doing one
4. Source Order Preceding op. Inspection Op. following Kardex
5. Purpose of operation To arrange work in groups of similar types of orders
6. Is purpose justifiable? No. 7. Is it accomplished? No.
8. Can it be accomplished otherwise? Yes-insist on orders flowing through in unit plan
9. Are other records available to serve same purpose? ____________
10. Can any portion of op. be eliminated and still accomplish purpose? ________ Describe Entire operation can be eliminated.
11. Does any part of this op. duplicate work on any other? Yes
12. Can op. be combined with another to advantage? Record for dept. record should be kept by individual operator.
13. What is unit of work? Mass of orders and correspondence
14. What is total time per day devoted to this work? 15 mi. - 30 mi
No. of units done? ____________
15. What is net time required present method? (Time for ________ one x number done ____________
16. Describe equipment used ____________
17. Can equipment be changed to better op? No.
18. Is flow of work continuous or interrupted? regular - not continuous
a. If interrupted can this be prevented? ____________
19. Are workers well adapted to work? No.
20. Are workers interested? Yes 21. Are they expert? No.
22. Do all workers use same method? Only one
23. What incentives are used to encourage production or quality? No.
24. Are there unnecessary motions of fatigue of following sorts?

Walking ______
Standing ______
Stooping ______
Twisting ______
Lifting ______
Bending ______
Reaching ______
Handling ______
Sorting ______
Rubber Stamping ______
Writing ______
Filing ______
Talking ______
Noise ______
Use of Eyes ______
Repairing ______

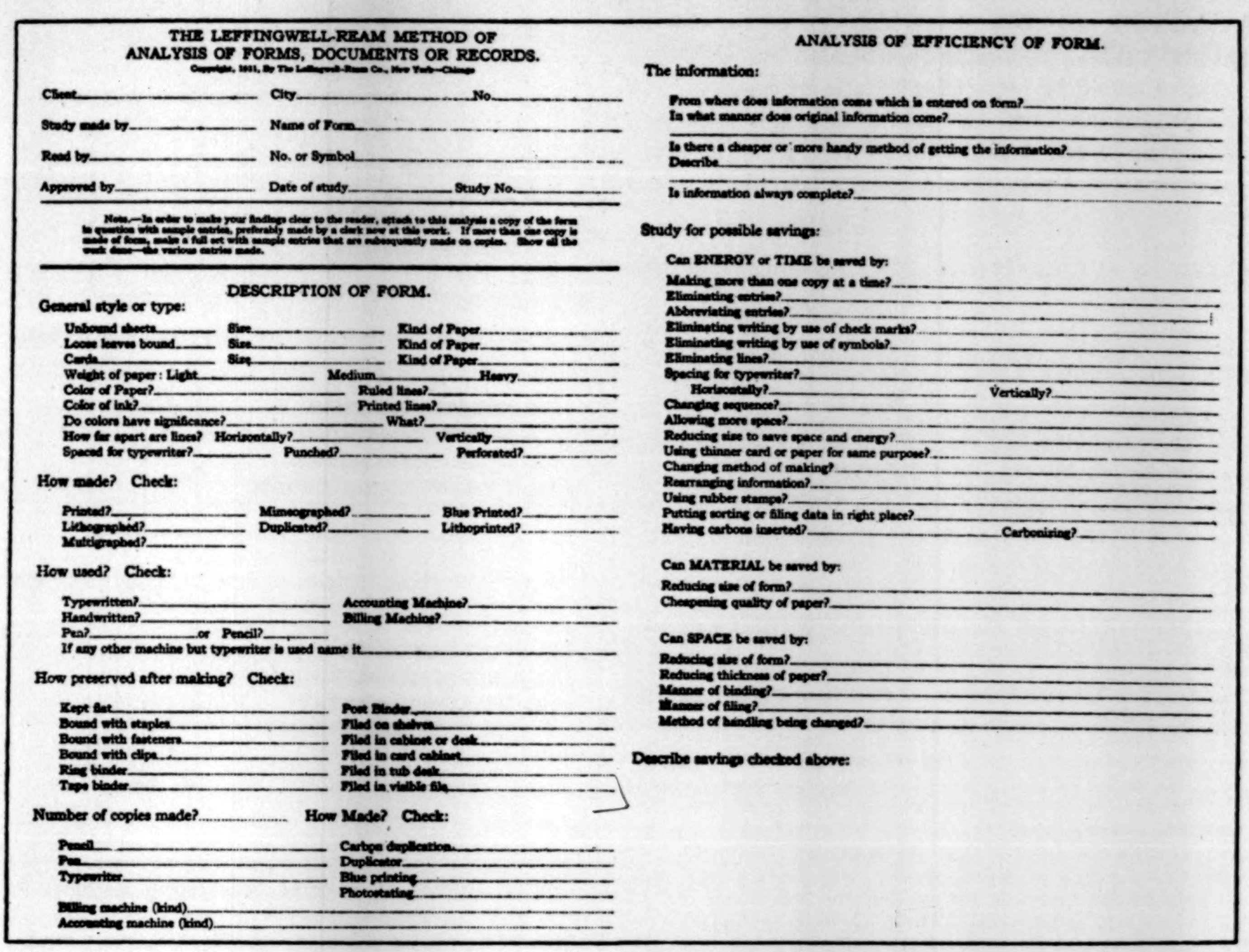
Note: If insufficient space on this sheet use additional blank sheets - numbering sheets and questions.

Fig. 8. Form for Analysis of Operation.

This shows a standardized method of analyzing an operation. The operation itself is unimportant. Every operation under consideration is analyzed in this minute fashion. A study of this sort inevitably leads to an improvement in the method.

Another sheet used to analyze a form, document or record is shown herewith to illustrate a still further standardized method of analysis (See Figure 9):

A survey was made of the reports which were being issued by the Statistical Department, with the result that several reports were discontinued and a number were changed to meet changed conditions. The



THE LEFFINGWELL-REAM METHOD OF
ANALYSIS OF FORMS, DOCUMENTS OR RECORDS.

Copyright, 1921, By The Leffingwell-Ream Co., New York—Chicago

Client City No.
Study made by Name of Form
Read by No. or Symbol
Approved by Date of study Study No.

Note.—In order to make your findings clear to the reader, attach to this analysis a copy of the form in question with sample entries, preferably made by a clerk now at this work. If more than one copy is made of form, make a full set with sample entries that are subsequently made on copies. Show all the work done—the various entries made.

DESCRIPTION OF FORM.

General style or type:

Unbound sheets Size Kind of Paper
Loose leaves bound Size Kind of Paper
Cards Size Kind of Paper
Weight of paper: Light Medium Heavy
Color of Paper? Ruled lines?
Color of ink? Printed lines?
Do colors have significance? What?
How far apart are lines? Horizontally? Vertically
Spaced for typewriter? Punched? Perforated?

How made? Check:

Printed? Mimeographed? Blue Printed?
Lithographed? Duplicated? Lithoprinted?
Multigraphed?

How used? Check:

Typewritten? Accounting Machine?
Handwritten? Billing Machine?
Pen? or Pencil?
If any other machine but typewriter is used name it

How preserved after making? Check:

Kept flat Post Binder
Bound with staples Filed on shelves
Bound with fasteners Filed in cabinet or desk
Bound with clips Filed in card cabinet
Ring binder Filed in tub desk
Tape binder Filed in visible file

Number of copies made? How Made? Check:

Pencil Carbon duplication
Pen Duplicator
Typewriter Blue printing
Photostating
Billing machine (kind)
Accounting machine (kind)

ANALYSIS OF EFFICIENCY OF FORM.

The information:

From where does information come which is entered on form?
In what manner does original information come?
Is there a cheaper or more handy method of getting the information?
Describe
Is information always complete?

Study for possible savings:

Can ENERGY or TIME be saved by:

Making more than one copy at a time?
Eliminating entries?
Abbreviating entries?
Eliminating writing by use of check marks?
Eliminating writing by use of symbols?
Eliminating lines?
Spacing for typewriter?
Horizontally? Vertically?
Changing sequence?
Allowing more space?
Reducing size to save space and energy?
Using thinner card or paper for same purpose?
Changing method of making?
Rearranging information?
Using rubber stamps?
Putting sorting or filing data in right place?
Having carbons inserted? Carbonizing?

Can MATERIAL be saved by:

Reducing size of form?
Cheapening quality of paper?

Can SPACE be saved by:

Reducing size of form?
Reducing thickness of paper?
Manner of binding?
Manner of filing?
Method of handling being changed?

Describe savings checked above:

Fig. 9. Pages 1 and 3 of a Form for Analysis of Forms, Documents and Records.

form of the Cloth Control Report was changed, so that the keeping of the records on which this report is based were reduced from thirty-five or forty hours a week, to six or seven. This resulted in the elimination of one clerk. Copies of orders from which the Statistical Department punched tabulating machine cards were formerly filed for an indefinite period. It was decided to throw these away immediately after the cards were punched . This resulted in a considerable saving of time. A twenty per cent reduction in the clerical work in this department was possible as the result of the preliminary survey. No attempt at standardization has been made to date. Detail operation analysis will undoubtedly yield a number of changes which will result in elimination of a considerable number of people. The method of making these analyses follows very closely the method used by Taylor engineers in factory work.

2. INVESTIGATION IN THE DEPARTMENT STORE

In the department store the same methods of analysis and research are used as in the factory office.

An example of the great amount of research necessary in order to properly standardize, is illustrated in a test recently made of four standard bookkeeping machines. The customary way to decide upon a piece of office equipment is to ask other firms now using the equipment how they like it. The result is a multitude of opinions, some favorable, some otherwise; and the management is at last compelled to make a decision based usually upon very poor judgment because of lack of experience. The arguments of salesmen as to the merits of their machines furnish no better basis for decision, for as a rule salesmen are neither modest nor careful in their statements. In the store used for illustration, the department managers had practically decided upon one make of machine, one of the oldest and best known. The salesman estimated that eighteen machines would be required, at a cost of $22,000. It was decided, however, to make a thorough scientific test. Four leading manufacturers were asked to send machines for the test. The following conditions were submitted to the manufacturer and agreed upon:

CONDITION OF TESTS OF BOOKKEEPING MACHINES FOR ———— COMPANY

1. The test will be made at .... Company's premises.
2. The plan to be tested will be the unit plan using a continuous itemized ledger.
3. The copies to be made will be: (a) the bill; (b) the ledger.
4. The information to be shown will be that given on the present bill plus the payments and the daily balances on both statement and ledger.
5. A number of sales checks, credits, and payments will be provided sufficient to take an operator about one week to post.
6. You will furnish the machine and the trays or other equipment needed in connection with the work.
7. You will furnish the stationery to be used and bill .... Company for it.
8. Two runs will be made, one by an operator furnished by you, the other by a .... Co. operator trained by you.
9. As much time as is needed will be allowed for training the .... Co. operator, but not to exceed two weeks. The length of time required, however, will be recorded as one of the elements entering into the test.
10. The training of the .... Co. operator is to be done on the .... Co. premises.
11. The checking of the work will be done by clerks furnished by .... Co.
12. Operators will head up both statements and ledgers.
13. The sales checks, credits and payments will be so selected as to give a test of posting several times to an account and for several months.
14. Each operator will be required to locate her own errors when out of balance, and to make her own corrections.
15. During the operation of the test no salesman will be present. The demonstrator, however, may be present to straighten out any difficulties that may arise.
16. You will furnish us with an estimate of the cost of stationery and equipment needed with your machines in the event of their being selected.
17. During the tests our engineers will make unit time studies of all the operations performed.
18. You will give us an estimate of the salary that must be paid to secure new operators.

The test lasted for a period of six weeks and the results are shown on the accompanying chart (See Figure 10):

It will be noticed that the machine which stood the highest in the test "A" had a record which would make only nine machines necessary. Naturally there could not be more than nine operators, whereas the original estimate of the salesman of the machine which was first considered was 18 machines and 18 operators.

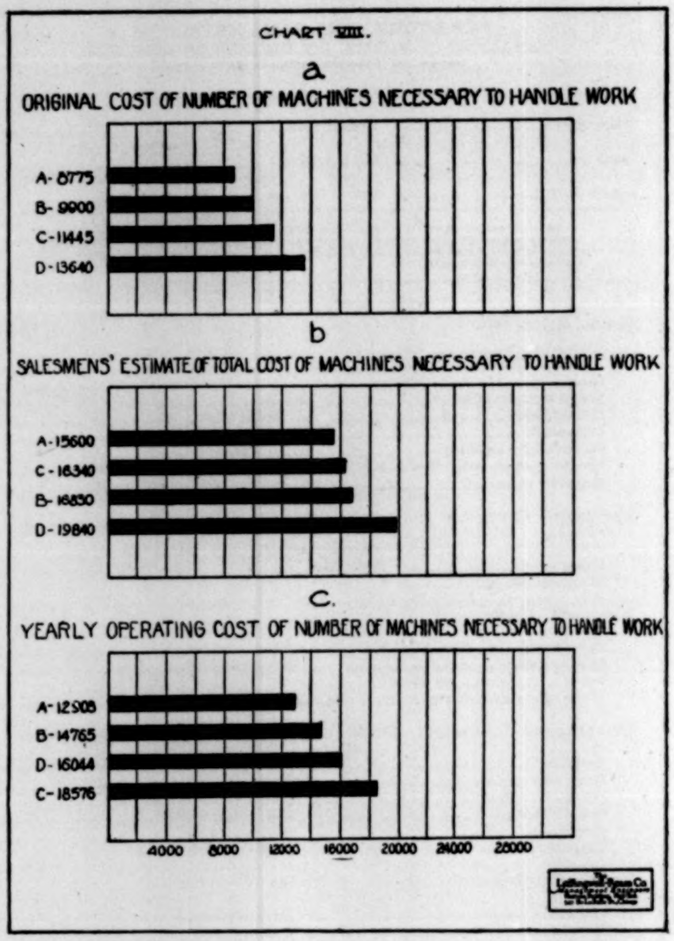


Fig. 10. Result of Tests of Bookkeeping Machines.

To get a line on the methods of office equipment salesmen, after the test had been completed, each salesman was given another opportunity to estimate the number required and all reduced their original estimates, knowing that we were dealing with facts and not theories. The machine which it had been intended originally to purchase, is third in rank of the four machine tested. The one with the best record had been originally not even considered as a dark horse.

The following is a conservative estimate of the saving resulting from this investigation:

Cost of 18 machines originally considered .	$22,000
Cost of nine machines with best record . .	9,000
	$13,000
Cost of 9 operators per annum	9,000
Total saving first year	$22,000
Cost of test; about	2,000
Net saving first year	$20,000

The papers covering this one investigation number 125 sheets. It was amply demonstrated that such an investigation pays.

In the planning department of the department store the following standard method of compiling data is established:

.... Company. Planning Standard Practice No. 1.

METHOD OF COLLECTING AND PRESENTING INFORMATION

Par.

1. In solving a problem there are three stages as regards the recording of information. These are
   - A. Collecting initial data.
   - B. Arranging the information and statistics collected so they may be understood by anyone who reads them, and to permit the drawing of correct conclusions.
   - C. Writing a report to secure the approval of the executives to the proposed changes.

COLLECTING INITIAL DATA

2. The notes taken and the information collected are intended to be merely temporary. As soon as the data have been recorded, the paper on which the notes were taken can be destroyed. For convenience in handling and carrying, a very light weight 3" x 5" card can be used for a variety of purposes such as:
   - A. Making observations.
   - B. Making notes of present routing, methods, suggestions, and so forth.
   - C. Making memoranda for tickler purposes, and so forth.
3. When necessary to use a larger sheet, one 8½" x 11" should be used.
4. For making time studies or collecting statistics for which a standard form exists, such form should be used.
5. For making tabulations that can be handed to a typist to be copied, a standard sheet 8½" x 11" should be used.

ARRANGING DATA COLLECTED

6. Initial data as usually taken are in such form that only the person who made the notes can understand them, and even he cannot be certain as to their significance after a lapse of time. For this reason it is important that all rough notes be worked up and dictated, and all tabulations be typed with adequate headings and explanation. When this has been done, the initial data may be destroyed except for such forms as Time Studies which do not need to be copied.
7. Before dictating, considerable thought should be given to the arrangement and sequence of the material. The better organized this material is, the easier will be writing of the report and the more readily can it be understood by others.
8. Whenever possible to do so, data should be listed in outline form as illustrated in the first paragraph.
9. Further subdivisions of the outline should be:

I. x x x x x x x x x x x x x x x x x x x
   A. x x x x x x x x x x x x x x x x x
      a. x x x x x x x x x x x x x x x x
         (1) x x x x x x x x x x x x

10. The 1 should begin at the margin. The first word should start on the sixth space in from the margin. The indentation should start on the sixth space in from the margin and so on.
11. Typing should be double spaced to permit interlining.
12. Frequent use of main and sub-headings should be made.
13. All papers should be dated.
14. A standard 8½" x 11" sheet should be used.
15. Sufficient copies should be made to avoid danger of losing valuable data.

WRITING REPORT

16. When all data have been collected and arranged in understandable form, they should be studied to bring out the solution to the problem. When this has been arrived at the report should be written and any necessary charts or diagrams made up.
17. A report is intended to "sell" a new idea or method, and should be always considered from the selling point of view. Hence it is vitally important that the material be presented attractively, clearly and logically.
18. In general the arrangement of the report should be:
   - A. Subject of the report in capital letters at the top of the page.
   - B. Introductory paragraphs, telling the purpose of the record and briefly what the proposed changes will accomplish, and any other necessary general remarks.
   - C. Description of present methods and statistics collected.
   - D. Description of proposed methods.
   - E. Advantages of proposed methods.
   - F. Conclusion, making specific recommendations and summarizing the advantages.
   - G. Closing, "Respectfully submitted."
   - H. Signature of whomever worked on the problem. If a representative of the Leffingwell-Ream Company worked on the problem, the signature of that company in capital letters should be shown and not simply his own personal signature.
   - I. Date at the left of the signature.
   - J. Under the date, the word "Approved" and space for the signatures of whatever .... Co. executives are required and the date of approval.
   - K. Charts and diagrams should be used as much as possible to present information graphically. These and tables too large or too detailed for inclusion in the body of the report should be numbered and attached after the last page of the report.
19. The margins should be
   - A. Top.
   - B. Left.
   - C. Right 1⅜ inches.
   - D. Bottom 1½ inches.
20. Each page should be numbered in the middle at the bottom ¾ inches up.
21. Typing should be single spaced with two spaces between paragraphs.
22. Block style of paragraphs should be used.
23. Paragraphs should be short.
24. When outline form is used, it should be done as described under "Arranging Data Collected."
25. Center and side titles or headings of successive importance should be shown as follows:

CAPITALS UNDERLINED

CAPITALS NOT UNDERLINED

Small letters underlined

Small letters not underlined

26. Copies should be made for each person concerned, and two extra for the data file. The copy for Mr. Stewart, Jr., should be on red lined paper punched to fit his binder, the copies for distribution on paper punched to fit a three-ring binder, the two for the file on unpunched, thin white paper. All should be standard 8½" x 11" sheets.

July 19, 1921. Signed

Approved

Each investigation is classified and a central file of all investigations is kept. This file is thoroughly cross-indexed, and as years pass it will become a very valuable mine of information on department store practice.

3. INVESTIGATION IN THE BANK

All standardization so far accomplished has proceeded along the lines outlined above.

V. INSPECTION AND MAINTENANCE OF QUALITY

It is folly to adopt standards of output and leave out of consideration inspection for the maintenance of quality. In devising any standards, therefore, quality is given first consideration and inspection methods devised.

1. INSPECTION IN THE FACTORY OFFICE

All letters leaving the stenographic department are first proof-read for minor corrections, typographical errors, etc. This enables the department to maintain quality.

Orders are finally inspected at one source.

A periodical check of all filing, whether on cards or correspondence, shows just how well the work is being done. It is not necessary to inspect all filing at one inspection, just as it is unnecessary in checking Taylor stores-room balances to check all stores. Tests are made of certain units of the work, and results found are considered a measure of the entire work.

Other examples of inspection are unnecessary.

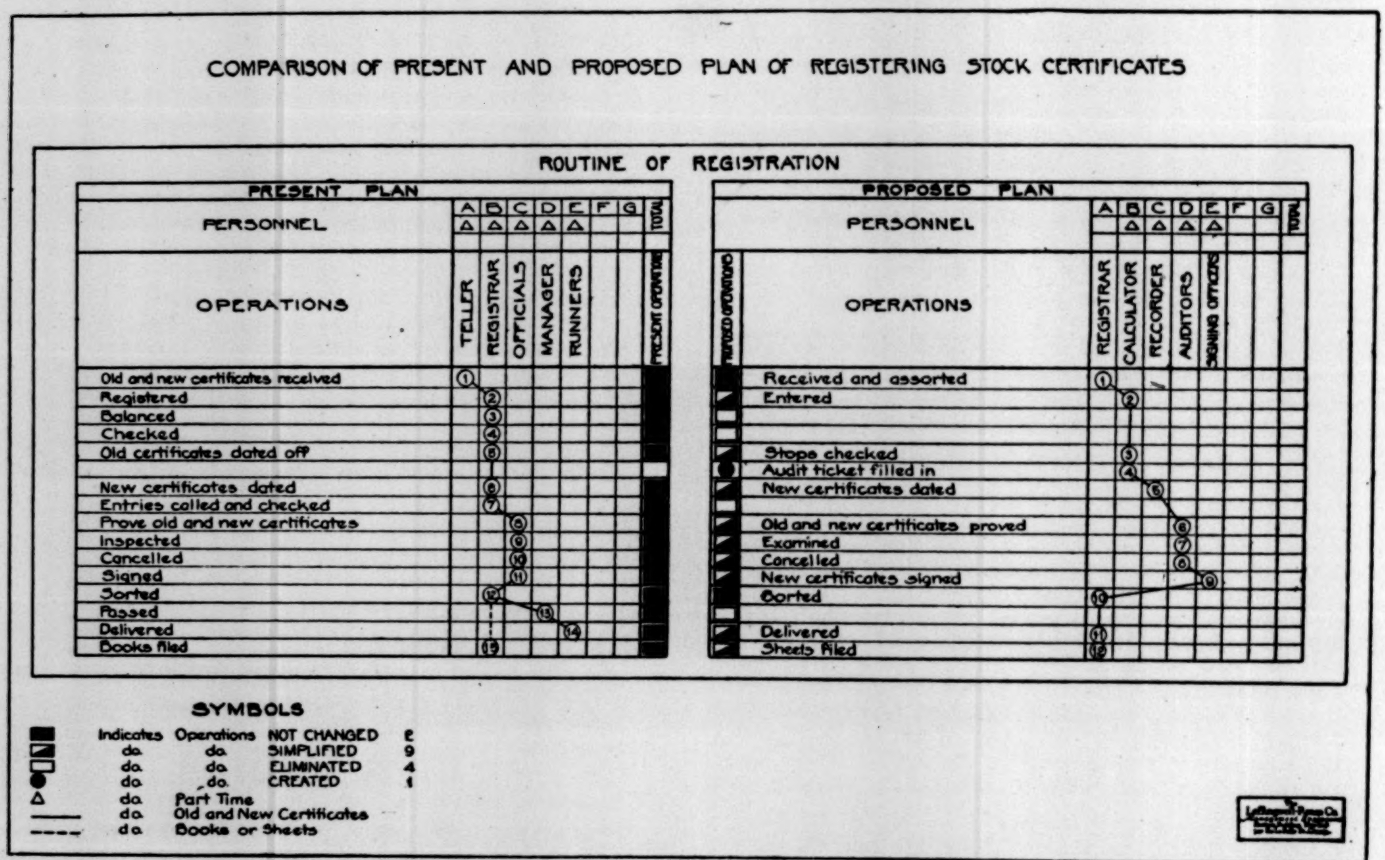
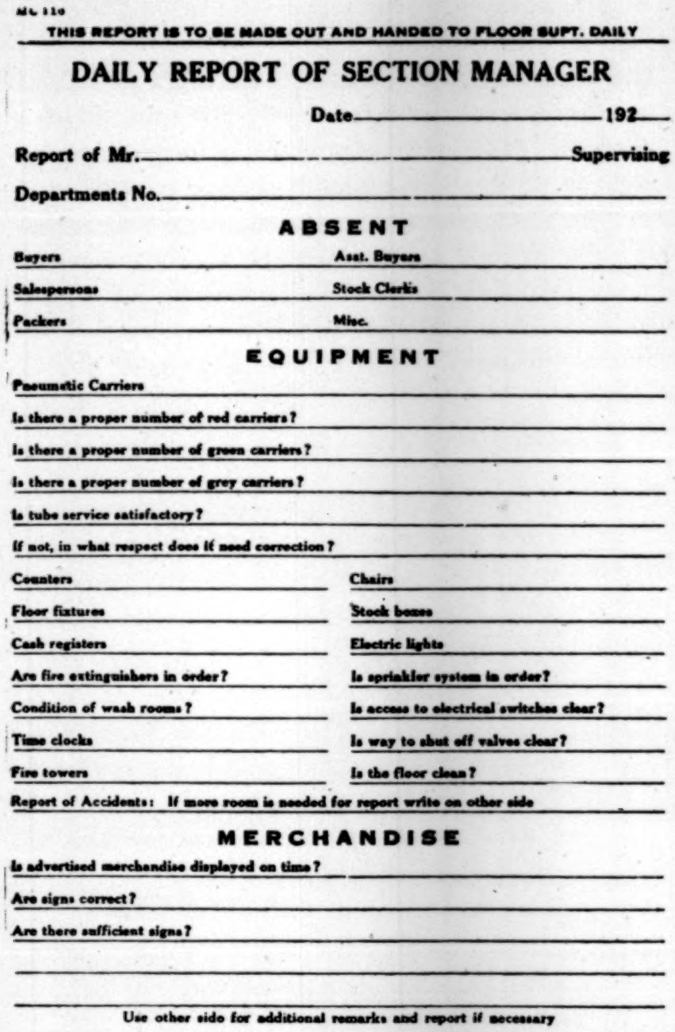


Fig. 11. Result of Analysis of an Operation in a Bank.

In Figure 11 we have shown a typical method of charting the comparative value of one routine over another. When a routine is charted in this manner its weaknesses become apparent. The new routine shows four operations eliminated, nine simplified, and one created. Of course the example shown is only illustrative of a method of analysis.



MC 110

THIS REPORT IS TO BE MADE OUT AND HANDED TO FLOOR SUPT. DAILY

DAILY REPORT OF SECTION MANAGER

Date________________192__

Report of Mr.____________________Supervising

Departments No.____________________

ABSENT

Buyers Asst. Buyers

Salespersons Stock Clerks

Packers Misc.

EQUIPMENT

Pneumatic Carriers

Is there a proper number of red carriers?

Is there a proper number of green carriers?

Is there a proper number of grey carriers?

Is tube service satisfactory?

If not, in what respect does it need correction?

Counters Chairs

Floor fixtures Stock boxes

Cash registers Electric lights

Are fire extinguishers in order? Is sprinkler system in order?

Condition of wash rooms? Is access to electrical switches clear?

Time clocks Is way to shut off valves clear?

Fire towers Is the floor clean?

Report of Accidents: If more room is needed for report write on other side

MERCHANDISE

Is advertised merchandise displayed on time?

Are signs correct?

Are there sufficient signs?

Use other side for additional remarks and report if necessary

Fig. 12. Inspection Report.

2. INSPECTION IN THE DEPARMENT STORE

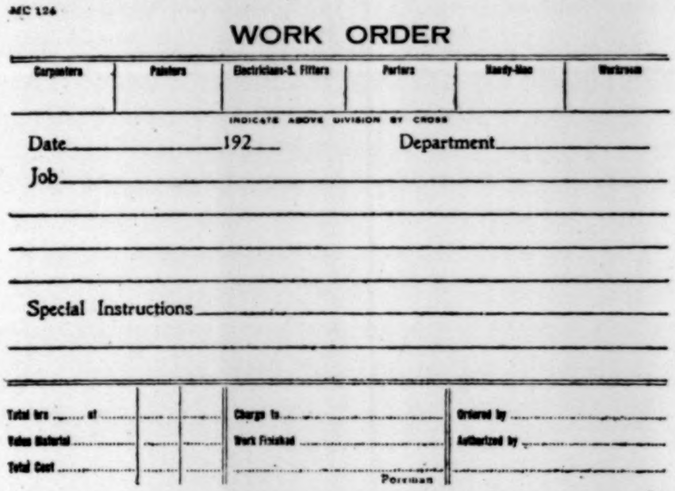
In the bookkeeping department ledgers are kept in balance constantly, which is an unusual thing in department stores. Periodical test audits are made to prove the correctness of entries. Periodical tests are also made of billing work in the same manner.

In all departments methods are in use to record errors. These errors are classified, and where there is a sufficient quantity of a certain type to justify an investigation, the matter is studied and the proper standard practice methods applied to minimize that error in the future. In addition, special stress is laid upon this type of error by the training department. As a result of this work, the errors have, as stated previously, been reduced from about three to one-half of one per cent. As a further result of the reduction of errors, complaints from customers, as has been before stated, have been reduced forty-two per cent.

Another interesting item is the method of daily plant inspection reports, giving the management a systematic check on conditions. A copy of the daily report follows (Figure 12).

If, as a result of this inspection, certain maintenance work is to be done in addition to the regular daily schedule, a work order is made out (Figure 13) and the work scheduled. A close follow-up is kept.

This has resulted in much better up-keep throughout the store.



MC 124

WORK ORDER

Carpenters	Painters	Electricians-S. Fitters	Porters	Handy-Man	Workroom

INDICATE ABOVE DIVISION BY CROSS

Date____________192__ Department____________

Job____________________

Special Instructions____________________

Total hrs ...... at ......

Value Material ......

Total Cost ......

Charge to ......

Work Finished ......

Foreman

Ordered by ......

Authorized by ......

Fig. 13. Work Order.

3. INSPECTION IN THE BANK

The work has not progressed far enough to cover this phase of the subject.

VI. SCIENTIFIC OFFICE ARRANGEMENT

Not one per cent of the offices with which we have come in contact are planned; most of them are the result of growth. Arrangement is usually not logical in any respect, and many fundamental requirements for good work are ignored.

Scientific office arrangement implies a careful analysis; first, of the needs of the particular office in question; and second, the planning of that office arrangement so as to most thoroughly and economically satisfy those needs. The result of such analysis and synthesis is invariably a better arrangement in every way, and besides most liberally pays for the expenses in reduced space, better working conditions, and elimination of much lost energy.

Violation of the fundamental requirements of good office working conditions is most common. The subject is a very broad one and little can be said in this paper beyond the barest details. Our standard practice on the subject covers some six hundred typewritten pages.

1. LIGHTING

A. Artificial light. Clerical work requires from five to ten foot-candles of evenly diffused light on the working surface, and the elimination of all glare. This is best obtained by the use of totally indirect lighting, although it is claimed by some lighting experts that there is a psychological value in permitting the clerk to see the source of the light. We doubt the validity of this claim but are willing to compromise, provided at least ninety per cent of the light is indirect. This prevents glare. Individual desk lights should not be permitted.

B. Daylight. Direct sunlight shining through a window causes a great deal of glare and discomfort. In cases where there is much discomfort from this source, we recommend Diffusilite Blinds, a venetian blind having an enameled upper surface which reflects the sunlight upon the ceiling and eliminates glare by giving proper diffusion of the light.

2. HEAT AND VENTILATION

Most offices located in office buildings have little control over this problem. The heat is usually obtained from steam radiators and the ventilation from the windows. The best practice is to combine the heating and ventilation with a forced draft system, heating or cooling the air at its original source. Small offices may correct their ventilation by the use of interior ventilators of the Garner type.

3. NOISE REDUCTION

The problem of noise in a large office is a serious one. A noisy office is a fatiguing one and results in nervous strain, which is entirely unnecessary. Noise is caused by the reverberations of the initial sound. Sound waves are reflected by hard surfaces and absorbed by soft ones. Most offices have hard surfaced walls and ceilings which absorb but little of the sound and reflect most of it. Professor Sabin of Harvard discovered that a ceiling of hair felt covered with white muslin would absorb fifty-seven per cent of the sound waves coming into contact with it. We have found that the use of this sound-absorbing felt makes a quiet office and greatly improves working conditions.

There is a sound-absorbing stone which can be used for architectural effects.

4. PROPER ROUTING

The proper flow of work from one clerk to another in an office is a subject that is rarely given the attention it deserves. The office should be planned with this thought in mind. Those who must have access to customers or visitors should be placed where that is possible with the least annoyance to those who must concentrate upon their work. The relation of one department to another must be carefully considered. The relation of workers within a department must also be considered.

5. SCIENTIFIC ARRANGEMENT IN THE BANK

Our first problem in the bank was to scientifically arrange the new premises. A brief outline of how this was done will be of interest.

Departmental surveys were made similar to the following standardized form:

REPORT OF SURVEY

.... December 2nd, 1920.

1. Functions
    (a) Analysis of customers' accounts.
    (b) Miscellaneous reports covering earnings, expenses, etc.
    (c) Maintenance of budget.
2. Location
    At present located on third floor, which is entirely suitable.
    It is recommended that this department be placed on the third floor of the new building.
3. Space
    The present area is not sufficient. It is suggested that from 35% to 50% more space be allowed this department in the new building.
4. Equipment
    Present equipment is not sufficient. One more section for book-case and stationery cabinet is required in addition to the exchange of one single pedestal flat desk for a small desk now in use.
5. Personnel
    Mr. ...., one assistant, one stenographer and one clerk. Work in arrears; requires additional clerk; request has been made and approved.
6. Relation
    Directly under Assistant Cashier, Mr. ...., and not related to any other department.
7. Material Received
    General correspondence, analysis forms and reports; can be received and delivered by messenger.
8. Communication
    Present telephone service criticised. Almost all calls are internal. Only external, outside of personal ones, are a few in connection with Club activities.
9. Expansion
    If additional space recommended under paragraph three is supplied, it will be sufficient for the requirements of this department.

10. Suggestions
    Mr. .... has no suggestions that effect his particular work at the present time, but has made various general suggestions.
    Comment. I suggest that a study be made of the various reports prepared by this department. It is possible that some of these reports can be eliminated.
11. Forms
    Three sets of forms used by the Analysis Department have been secured.

It will be readily understood that such a survey will yield a heavy by-product in ideas for the elimination of wasted energy. It is difficult to refrain from making such corrections at the moment. Careful note is taken, however, of all such opportunities for saving for future use.

6. MAKING THE FLOOR PLAN

Next a floor plan is made to scale; we have standardized upon a scale of ¼ in. to 1 ft. A set of standardized symbols are used to make reading of plans simple. Each piece of furniture is drawn in to exact scale in its exact present location. Whenever necessary for purposes of analysis, the flow of work is indicated on this drawing. From this tracing lithoprints are made. Our reasons for using lithoprints instead of blueprints are as follows:

1. Blueprints shrink and dimensions are never correct. Lithoprints do not shrink.
2. Lithoprints may be obtained on any kind of paper in black lines.

Three copies of the lithoprints are made; (1) on white drawing paper; (2) on green cardboard; (3) on heavy brown drafting paper. These are afterwards used for cutting templets.

A lithoprint drawing of the new floor plan (without desks or other furniture) is then mounted with thumb tacks on a cork board, and templets are pinned in place with small glass headed pins in the exact location desired. Here a standard color scheme is used as follows:

1. White templets indicate present furniture reused.
2. Green templets indicate expansion space allowed.
3. Yellow templets indicate new furniture to be purchased.

The use of templets enables one to move them about easily, trying many tentative plans until an arrangement is made that meets the approval of all. The use of cork-board backing enables one to pin the templets down securely, so that the plan may be moved about, stood on end, or otherwise handled as is necessary.

It is our practice to allow space for future expansion in each department and indicate it exactly by duplicating the templets, using green as stated above.

7. PLANNING THE PLAN

Before beginning on the final plan as outlined above, there is, of course, a great deal to be done in studying the information obtained on the departmental surveys. Lists of furniture must be prepared, estimates of the amount of space required for each department made from the space formerly occupied by the desks used in those departments, alphabetical lists of persons, and so forth. It is unnecessary to go into all of the preliminary planning work required, but it is sufficient to say that the amount of this work is usually far greater than the client has imagined. Many things are thought of which ordinarily are forgotten until the last moment. The data required for the analysis of the requirements for the bank in question covered hundreds of typewritten pages.

8. DETERMINING STANDARDS TO BE FOLLOWED

A new office gives an excellent chance to determine upon standards for desks, tables and other pieces of equipment. With space at $6 a foot, as it is on lower Broadway, the size of a desk is an extremely important item. It was proved that for practically all clerical operations a desk 60" x 30" was ample, while for a large number of operations, 48" x 30" was sufficient. It was decided to limit all desks to the first dimension; those larger were to be junked in the interests of economy of space. Let us see what this amounts to. First; the average desk is about 30 inches wide, a minimum requirement for working space is another 30 inches, making a total five feet in length. Every foot saved on a desk, therefore, means a minimum saving of five feet of working space. At $6 a foot this is an annual saving of $30 or ten per cent interest on $300. But this is not the only saving, for if desks are placed in rows, as they must be in large offices, an odd-sized desk may not only waste space of its own, but compel the planner to allow additional waste space on all other desks of smaller sizes in the same row. We have seen instances of the waste of 100 square feet in this manner! More than one hundreds desks and tables were junked as being oversized and not otherwise standard. This was not waste, but actual economy, as will be shown later.

As was previously stated, all metal equipment behind tellers' cages was standardized on the interchangeable unit plan. At the same time other special desks were designed as follows:

A special bookkeeping machine desk for bank use.

A special clerical table, previously described.

A coupon sorting desk.

Sanitary drinking fountains were placed at all convenient locations.

Indirect lighting was installed throughout, a washed air heating and ventilating system installed, linoleum floors, and No-noise sound deadening ceilings placed on all clerical working spaces.

When the plans were complete, it was found that there had been devised not only a highly desirable place so far as working conditions were concerned, but an actual saving in floor space of 8,800 sq. ft. over original estimates had been made; a saving amounting to $52,800 per annum!

VII. MOVING AN OFFICE

When the building was complete and ready for release by the builders, there was the problem of the move. As this involved the moving of the equipment for over 500 clerks from two different locations to one new one, it will be readily understood that this required a great deal of pre-planning.

1. DETERMINING WHAT IS TO BE MOVED

Offices about to move usually take advantage of the opportunity to get rid of old equipment which has outlived its usefulness, and to purchase new standardized furniture. The bank mentioned was no exception. For ready reference, when preparing floor plans complete lists of all equipment were made as follows:

A. A list alphabetically by users' names;
B. A department list;
C. A list by kinds of furniture and equipment.

All equipment was now checked against these lists and large printed cards with the words "DO NOT REMOVE" were fastened to those pieces which were to be left behind.

2. TAGGING THE FURNITURE

Each piece of furniture to be moved was tagged with a specially printed tag showing the number of the location as marked on the plan. There were four colors of these tags, a color indicating the floor in the new building on which furniture was to be placed. Bays were numbered and each tag bore in addition to name of occupant, the number of desk on plan, the floor in new building, and the number of the bay in which it was finally placed. In the new building we suspended large cards 12" x 14" from the lighting fixture in the center of each bay, bearing the number of the bay.

3. THE MOVE ORGANIZATION

An organization chart was prepared showing the manner in which those connected with the job of moving were to function.

4. INSTRUCTION CARDS

Complete written instructions were furnished to all superintendents, guides and moving gangs. There were many of these instructions issued, but the following example will suffice to show the method.

INSTRUCTIONS TO PLACING GUIDES

You have been assigned to supervise the placing of all furniture and other equipment in bays number .... between .... and .... The furniture and equipment will be brought to the various bays by the moving gangs.

As each article is received you will instruct the movers as to the exact location at which the article should be placed. You will determine this location in the following manner:

(a) A tag showing the floor, bay and article number is attached to each desk. It is tied to the back of each chair. It is tacked or tied to each filing cabinet, and is attached at the most convenient location to all typewriters, adding machines and all other equipment.

(b) Refer to the proper bay on the plans and locate the article bearing the same number as appears on the tag of the desk, table or whatever article is to be placed. The location of this article on the plans will show the location of the article on the floor.

(c) The exact location of all articles is marked on the floor. Point this location out to the movers and see that the article is placed in its assigned place. If you receive any article not provided for on the plan, but tagged for your bays, place it temporarily in an aisle that will not be required, and call it to the attention of the floor captain. Please check off on the blueprint each piece of equipment when it is placed in position.

(d) Watch carefully and see that desks are set so that the drawers open in the proper direction. The front can usually be determined by the extra heavy lines which indicate the pedestal, or by the position of the chairs in front of the desk.

(e) Be on hand in the bays assigned to you promptly at the time shown, and remain in these bays until relieved. It is very important that you be on hand when any article is brought to one of your bays, otherwise several of the movers will be delayed.

(f) Guides on all except the last shift will turn over to the guides who relieve them the mounted plan and rule. The guides on the last shift will before leaving turn over to the Captain the mounted plans and rule.

(g) The Captain may find it advisable to assign you to other bays. You will be governed by his instructions at all times.

In addition complete instructions were issued to all employees.

5. PREPARING THE SCHEDULE

A large chart was made showing the scheduled times for moving each department. Photostat copies of this chart were furnished to each Superintendent. In operation, colored tacks were placed on the schedule chart in the General Superintendent's office to show the beginning and ending of each departmental move.

6. THE ACTUAL MOVE ROUTINE

The moving company's workers were organized into eight gangs.

Old Building

Gang 1 Clear room;
2 Put furniture on elevator;
3 Take furniture off elevator;
4 Load furniture on van.

New Building

Gang 5 Unload furniture from van;
6 Load elevator;
7 Unload elevator;
8 Put furniture in final position.

Thus, it will be seen, we provided for a steady flow of the furniture from position in old building to position in new building.

7. HANDLING THE EXCEPTIONS

About a week before the actual move, a final canvas of the old building was made. Each piece or fixture which would require special treatment, such as detach wiring or knock down was noted. Working instructions were prepared, and experts did this special work in advance of the move.

All extra heavy pieces (for example thirty heavy safes) were moved the night before the regular move.

The floor plan was transferred with chalk to the actual floor. The exact position and number of each desk or cabinet, as shown on the original working plan, was marked. Thus all measuring during the move was eliminated.

8. THE ACTUAL MOVE

The move was scheduled to begin Saturday immediately after employees finished at 1 P.M., and to be completed at 11 P.M. Saturday—ten hours actual moving time. On account of a delay on the part of the safe movers we were unable to get the use of elevators in new building until 3 o'clock. We started the move, therefore, practically two hours behind schedule, although work in the old building started on time. With this handicap of nearly two hours, the move nevertheless was complete only half an hour behind the schedule. Due to the fact that painters, plumbers, electricians and laborers were still at work putting on the final touches, we were unable to place all desks in exact final position until midnight Sunday. The bank was open for business and all clerks working at their desks at the usual opening hour, 9 A.M. Monday. Not an hour of working time was lost.

9. ESTIMATING THE COST OF THE MOVE

The bank had no information which would guide them as to the cost, neither had we previously on other move work we had done considered it a part of our work to bargain with moving companies; we had always suggested to our clients that a contract be made on an hourly basis. The bank, however, preferred a lump sum basis, and got a bid from one company of $6,000 for the job. A hasty calculation showed us that deducting new furniture bought (which was delivered in place by the sellers), there were roughly about 600 pieces to be moved. This meant $10 a piece, which we considered exorbitant. Bids were then asked from ten moving companies, and finally a bid of $2,900 was accepted. Even this seemed too high, so we decided to prepare for such an emergency in the future. We time-studied the actual move. The studies were made by elements. Each element was planned and defined in advance and symbolized mnemonically, to facilitate rapid and accurate study. Then the studies were compiled and the elements figured. With the aid of these formulae we expected to be in a better position in the future to estimate the time taken for moving.

VIII. SUMMARY OF RESULTS

Because of the scope of this paper, it has been necessary to mention only briefly many subjects which are of great importance. A choice had to be made between treating the technique of some one phase exhaustively and mentioning briefly a wide range of subjects. The latter course was adopted for the reason that it is the writer's desire to show that scientific management is widely applicable to office work. There is a thought in the minds of many that the applicability is very limited indeed.

There is also a thought that it is applicable only to large concerns; but the factory office had only 60 clerks, the bank about 600, and the department store 2,500 when the work was started. There was range in the three cases cited. In proportion to the size, the results were about the same in each organization.

Scientific management is applicable to any size of office, even to one of half a dozen clerks.

The development of scientific management is a great factor in man-building. In each example quoted, there are now many more people interested in improving conditions than there were when the work was started; some, indeed, have made startling advances. This interest is evidenced not only in the executives but also in the employees. One employee made a suggestion which saved the company from spending upwards of $50,000 in a proposed building project. The progress we have indicated would not have been possible without this cooperation of executives and employees. We wish again to emphasize this fact: the results shown represent the work of many people in the organization of our clients.

Scientific management builds and perfects the organization. It increases cooperation. It increases interest. Having once thoroughly grasped the meaning and the possibilities of analysis, this magic touchstone is applied by many who previously performed their duties only subconsciously; who followed the ruts worn by their predecessors. Scientific management gives the management a control such as firms of the old type cannot comprehend.

And, scientific management pays. It is often charged that scientific control builds up a huge overhead; an army of clerks, a file room full of expensive records. Figures are not available to show a comparison of the cost of control methods mentioned with the former cost, for the main reason that such control as existed before was inextricably bound up with the regular routine. There is, however, no work that was not performed before. Possibly in all three establishments combined the sum might run as high as $50,000 a year; certainly not more. But a comparison of the total expenses previous to the development of scientific management and the present expenses shows a net saving in the three offices combined of approximately $675,000 per annum!

These savings were made possible by cooperation. Emphasis should be placed on the fact that scientific management is an educational process. It does not consist of systems which can be imitated. And it is this educational work which wins cooperation. Cooperation must be preceded by understanding.

IX. DISCUSSION

WALLACE CLARK:[1] I have listened to Mr. Leffingwell's paper with a great deal of interest and want to emphasize one of the points which he brings up, that is, that we must not mistake the mechanisms used in an office for scientific office management. A certain office appliance may be a remarkable mechanism and certain methods may be highly scientific, but that is not necessarily management.

The value of every mechanism and every detail of method should be judged from the point of view of *getting work done.* That is the yard-stick by which to measure all office work. For instance: in the manufacturing office there are production cards or job tickets which are used in two ways; first, to make up the payroll, and second, to enter on the cost sheet for that specific order. Should this work be done on a Hollerith machine or by hand? The machine is a remarkable mechanism and would be generally regarded as scientific, but judging the machine from the point of view of getting work done, it is found to be much slower and much more expensive. Good management would demand that this work be done by hand. Take another plant in which these production cards have to be classified and tabulated in six or seven different ways instead of two. In that case, the work can be done more rapidly and at considerably less cost if it is done on a tabulating machine instead of by hand. In that case, good management demands the use of a tabulating machine.

Suppose it is proposed in the supply stock room of an office, to use a mnemonic classification of stock items. This is usually regarded as scientific. That stock room is there to issue supplies when they are wanted. Suppose their aim is to fill requisitions within two minutes after their receipt. With that in mind, will the mnemonic classification help or hinder issuing of stock within the two-minute limit?

A stenographic department is organized to get work done; that is, to get into the mail by closing time all the letters dictated that day. It is highly desirable that the stenographers shall increase their speed by even a fraction of a word per minute, but the assignment of work there becomes of major importance. All copying is assigned to typists, leaving the stenographers free to write nothing but dictation. Routine typing such as addressing envelopes, copying lists, etc., is given to typists who can stand this uninteresting work, and the cutting of stencils is assigned to a "two-finger" operator, if there is one in the department. It may be called unscientific to use the typewriter with less than ten fingers, but stencils can unquestionably be cut better by a girl who uses only two fingers on each hand. The success of the management of a stenographic department is measured by its ability to get work done.

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[1] Consulting Engineer, New York.

There are three limits to getting work done:

1. It must be in accordance with a definite standard of quality;
2. It must be done at a reasonable cost;
3. It must be done at the time the work is wanted.

The relative importance of these three limits varies with each specific case. In some instances quality and cost are less important than time; and sometimes quality is most important of all, and where cost is the chief factor, quality and time take second place. However, in the doing of all office work, quality, cost and time must be considered.

Granted that the purpose of office management is to get work done with due consideration to quality, cost and time, what is the most important step for a management to take in order to reach this end? My experience has led me to believe that that most important step is the assignment of clear-cut jobs—giving a man necessary authority to do his work and holding him responsible for results.

You can probably call to mind two managers you have known; one who is exceedingly good on detail and is continually developing new forms and methods; but when the work comes into his office, hands it to anyone who may be nearest him, giving him most minute instructions as to how the work should be done. You probably know another manager who does not spend much time on the detail methods, but has the duties and responsibilities of his subordinates clearly understood; when work comes into his office, he assigns it to the man who is responsible for that kind of work. The manager never goes over that man's head to give instructions to subordinates, and holds that man responsible for the successful completion of the work, giving him, of course, whatever help he may require.

The first type of manager is too often regarded as scientific. The second type is not generally regarded as scientific, but there is no doubt in any one's mind about his being a manager. In any installation of scientific management in an office, therefore, the necessity for clear-cut jobs, adequate authority, and definite responsibility cannot be overemphasized.

As this authority and responsibility are conferred on individuals, they must be given the necessary help to enable them to shoulder those responsibilities. I have found that the easiest way to do this is not to sit down and study every detail of work done by the individuals in a department, and to write out full instructions as to how everything is to be done, but to find out what prevents them from doing their work satisfactorily. Referring again to a stenographic department whose task is to write out each day the letters dictated during that day, instead of starting out with a complete investigation of the details of that department, get a report showing how many lines of dictated matter are left over at the end of the day, and then get at the reasons why they were left over. That will lead directly to the condition which is most unsatisfactory and that can be investigated and the trouble remedied. In practically every kind of office work this can be done. In the multigraphing department, it is the lines of work left over at the end of the day; in the receiving department, the packages which have been received during the day, but not delivered at closing time; in the filing department, it is the unfiled letters or orders; at a telephone switchboard, it is the absence of the operators from the board; with the house electrician, it is the time the elevators were not ready to run or that lights were out; and so on through other departments.

I have suggested that the yard stick by which to measure the details in the management of an office is their effect on getting work done. The use of such a yard stick will help to eliminate and simplify office work. The engineer must eliminate idleness, unnecessary equipment, unused space. He must simplify methods of doing work; that is, in clerical work he must simplify the forms used and the method of transferring information from one form to another. In letter writing, he must simplify both the work of the dictator and of the stenographer. Office work has become so complicated during recent years, that it is top-heavy, and in the reorganization of an office one of the most important aims must be to simplify work. The success of any reorganization depends on the simplifying and elimination of work, and upon the training of all office workers to simplify their own work and overcome their own obstacles.

The responsibility of the engineer, therefore, is not only to conduct investigations and discover the best methods, but also to inspire workers constantly to investigate for themselves and discover better methods.

J. G. ALLEN:[1] Our experiences at the Curtis Publishing Company in the application of scientific management to the office, and the principles we have adopted as a result of these experiences, are essentially the same as those Mr. Leffingwell has noted in his paper. Therefore, the few words I have to say are not critical but rather in the effort to add to Mr. Leffingwell's paper, if possible, with a few illustrations of the manner in which we have handled certain problems in connection with our clerical force. Some eight or ten years ago we used the transparent celluloid scale, of which Mr. Leffingwell speaks, to measure stenographic work. We have since used a stroke meter, somewhat similar to the bicycle cyclometer, which is geared directly to the typewriter and registers the number of strokes made. We have found this to be more accurate because varying length of lines in the same letter makes it difficult to measure accurately in square inches. It is also less expensive because production can be secured by a meter reading once a day, which takes only a few minutes. This illustrates Mr. Leffingwell's point that the physical means of securing a result are not important, as production can undoubtedly be increased with either the use of the celluloid scale or of the meter.

We have found that requiring employees to report, say ten minutes earlier each morning than ordinarily, for a certain definite time, is a very effective cure for habitual lateness.

Our method of department reports differs from Mr. Leffingwell's method of having each department manager report on the condition of his department each month. We have a Personnel Committee consisting of four members of the Board of Directors, two members of our own department and the Employment Manager. Our department prepares a report on each department for this committee each month. Each department manager receives copies of the report for his department. These reports consider: first, the general condition of the department and, second, list by name all employees whose work is below standard, with the resulting money loss.

In practically all of our clerical departments the clerk records his or her own time and production on a daily time ticket. We have recently added to this ticket a space in which the clerk figures, at the end of each day, the bonus earned if her production has been over standard. If her production has been under standard she figures the resulting money loss. She then signs her name to the ticket. We have found this to be very effective in increasing production. Generally speaking, most people's personal pride will not permit them to turn in reports day after day showing a loss when other people are showing a gain on the same operation. Curiously, it does not effect these same people to such an extent when the figures are not actually computed by them.

In our department we keep a chart record card for each operation that each clerk works on. These cards last a year and show clerk's name, wage, and standard. The production hourly average made by the clerk each week on each operation is charted on the proper card. We have found this to be a very rapid and accurate method for following up the work of each individual.

Mr. Leffingwell has called attention to the fact that scientific management can be applied to the small as well as the large office. I wish to emphasize this by saying, that while in total number of clerks employed, our office is comparatively large, yet, on analysis, you will find that it is merely a combination of many small offices. Our method of applying scientific management principles has been to take a small group at a time and study that particular group in the effort to discontinue unnecessary work, do the necessary work by the easiest method, and establish standards of production. In many cases these groups have not consisted of more than fifteen to twenty persons. As an illustration, we recently standardized our Pay Roll Division work in which there were twenty-one clerks. Twenty different operations were standardized in this division, of which not more than three girls worked on any one operation. It is interesting to note that at this time we have only eleven clerks in this division as a result of the standardization work done.

"WE see that a carpenter becomes a carpenter by learning certain things; that a pilot, by learning certain things, becomes a pilot. Possibly also in the present case (of the search for better management and better industrial relations) the mere *desire* to be wise and good is not enough. It is necessary to learn certain things. This is then the object of our search." (From the "Golden Sayings" of Epictetus, LXVI, the words in parentheses and the italics being ours.)

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[1] Curtis Publishing Company, Philadelphia.

APPORTIONING SALES OVERHEAD[1]

TERRITORY VALUATION (THE QUOTA) SUPERIOR TO TERRITORY SALES AS A BASIS FOR APPORTIONMENT

By Charles P. Staubach[2]

At a recent meeting of the Taylor Society I presented a paper on the quota, or territory valuation, which has since appeared in the BULLETIN.[3] That paper was an explanation of the nature of the quota and of methods of computing territory valuation. The following paper is concerned with a particular aspect of the quota—its value as a basis for apportioning sales overhead—and assumes a familiarity with the nature of territory valuation presented in the earlier paper.

A new note of great potential value, particularly under present business conditions, is related directly to quota valuations of territory.

The manufacturer does not have to be shown the necessity of determining, accurately, the cost of manufacturing the various articles that make up his line. It is of equal importance that he should know not merely the cost of marketing his product, taking the field as a whole, but also just which selling agencies, branches and territories are making money for him and which are not. This can be done only by assessing in a statistical way, upon each selling unit, its proper share of the entire cost of marketing—in other words, distributing all overhead not included in manufacturing cost.

This distribution should not be made, as is so often done, on the basis of sales produced; otherwise an incorrect conclusion is arrived at as to the extent to which each selling unit is profitable or otherwise. To illustrate this, let us say that of two branches covering territories of approximately equal value, one is selling twice as much as the other. If we charge the first with twice as much of the general overhead, our conclusions will not be correct. Otherwise, in case one of these units sold nothing at all during a certain period, it would be charged with no general overhead whatever, concealing the actual loss, and the other would be penalized by having to absorb an excessive overhead, reducing its showing as to actual profit earned.

Penalizing successful selling units by a statistical distribution of general overhead based on sales does not locate the real source and extent of territorial profit and loss.

The proper method of ascertaining the territorial profit or loss would seem to be to credit each unit with the entire revenue it produces, and secure the net revenue by deducting its direct expenses, such as salaries, commissions, traveling expense, etc. Next, to charge in a statistical way, against it, its proper share of all items of Home Office expense, field supervision, and in general all expenditures and costs not already included in manufacturing overhead or direct expenses. Having done this, the share of this general overhead, apportioned to the unit, being deducted from its net revenue to the concern, indicates the extent of its actual marketing profit or loss.

What percentage of the total general overhead should be figured against each unit should be determined not by its sales, but by the sales valuation of the territory it covers; in other words, its sales quota. Quick figures can thus be secured, as the quotas of all units, being fixed, are known long before sales figures are available; and as soon as the overhead for a month or other period has been ascertained, it can be at once distributed ready for application against the revenue produced for the period immediately on that being recorded.

This is an additional use for sales valuation or quota statistics that has not been realized to the extent it appears it should be in business generally.

Perhaps the best way to illustrate the points to be brought out, is to present charts that show practical applications.

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[1] A paper presented at a meeting of the Taylor Society, New York, Dec. 2, 1921.

[2] Glen Ridge, N. J.; formerly General Sales Manager, The Burroughs Adding Machine Company.

[3] Vol. VI, No. 5, October, 1921.

I have not prepared charts or schedules showing the actual application of the plan to recording profits and losses of branches or agencies, except as I will explain. Such applications are in effect, however, and I hope may be available at a future meeting of this Society.

The same plan can be used to advantage in the individual branch or agency, to determine which salesmen are making money for the branch and which are not.

The point I wish to emphasize is, that this cannot be properly decided on a basis of sales volume; or, in other words, ascertained by charging the general overhead against the various salesmen's territories prorated in proportion to the sales they produce.

To find out, accurately, which men are making money for the agency, and how much, contemplates; first, crediting each territory with the entire earnings secured by the agency from the sales the territory produces; second, charging each territory with its direct expense, such as salaries, commissions, bonus, etc.; third, charging statistically each territory with its proper share of all general overhead, such as rent, office salaries, office expense, advertising, etc., strictly on a sales valuation or quota basis. The result will show the agency profit or loss on that territory.

Four charts will be shown which illustrate the operations of the various salesmen's territories that constitute an agency.

If your firm handles its business directly through salesmen, reporting to the home office, then these forms will illustrate your operations as a whole.

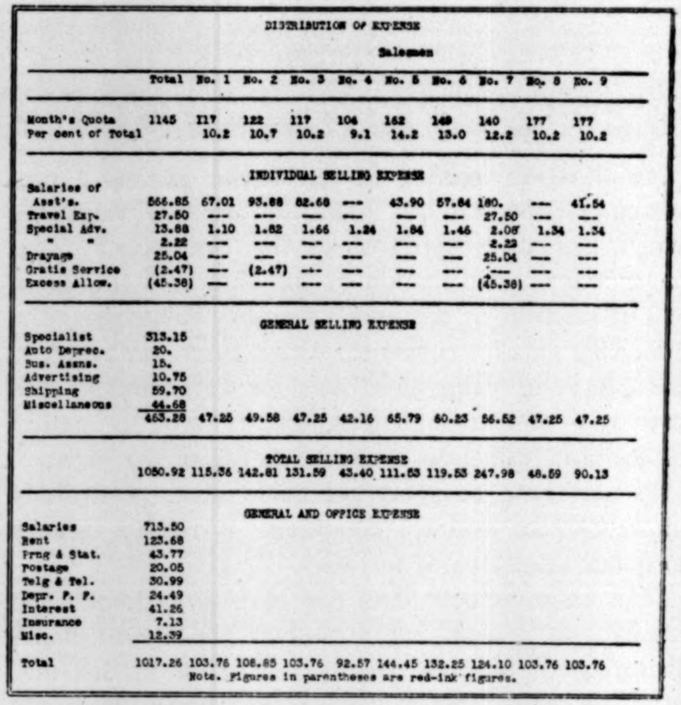
On the other hand, if you are more interested in tracing the operations of your agencies or branches, you have only to consider that each of the columns shown represents a branch, and the total column, the operations of your company as a whole, to see how readily what I have to say will apply as well to a comparison of agencies as to the comparison of selling territories that will receive our particular attention.

Please do not overlook the importance of an analysis, in any event, of the operations of the individual territories constituting an agency; because you cannot have a successful agency without successful salesmen, any more than you can have a successful company without well-conducted agencies or dealers handling your product profitably to themselves and to their selling force.

Chart I shows one month's transactions, and is a distribution of expense.

The total column represents the agency's operations for the month, and the numbered columns its various salesmen. In the same way the form may represent a company's operations in its total column, and its various agencies, branches, or dealers in the numbered columns.

In the total column appear the figures taken from the books—against which they must prove.



DISTRIBUTION OF EXPENSE

Salesmen

	Total	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9
Month's Quota	1145	117	122	117	104	162	149	140	177	177
Per cent of Total		10.2	10.7	10.2	9.1	14.2	13.0	12.2	10.2	10.2
INDIVIDUAL SELLING EXPENSE										
Salaries of Asst's.	566.85	67.01	93.88	82.68	---	43.90	57.84	180.	---	41.54
Travel Exp.	27.50	---	---	---	---	---	---	27.50	---	---
Special Adv.	13.88	1.10	1.82	1.66	1.24	1.84	1.46	2.06	1.34	1.34
" "	2.22	---	---	---	---	---	---	2.22	---	---
Drayage	25.04	---	---	---	---	---	---	25.04	---	---
Gratis Service	(2.47)	---	(2.47)	---	---	---	---	---	---	---
Excess Allow.	(45.38)	---	---	---	---	---	---	(45.38)	---	---
GENERAL SELLING EXPENSE										
Specialist	313.15									
Auto Deprec.	20.									
Bus. Assns.	15.									
Advertising	10.75									
Shipping	59.70									
Miscellaneous	44.68									
	463.28	47.25	49.58	47.25	42.16	65.79	60.23	56.52	47.25	47.25
TOTAL SELLING EXPENSE	1050.92	115.36	142.81	131.59	43.40	111.63	119.53	247.98	48.59	90.13
GENERAL AND OFFICE EXPENSE										
Salaries	713.50									
Rent	123.68									
Prng & Stat.	43.77									
Postage	20.05									
Telg & Tel.	30.99									
Depr. F. F.	24.49									
Interest	41.26									
Insurance	7.13									
Misc.	12.39									
Total	1017.26	103.76	108.85	103.76	92.57	144.45	132.25	124.10	103.76	103.76

Note. Figures in parentheses are red-ink figures.

Chart I. Distribution of Expense.

You will note that at the head of the columns are shown the month's sales quota assigned to each territory, and the percentage that this quota bears to the total quota.

We first tabulate the month's expenses under three general heads: First, selling expense, falling upon the agency and not upon the individual territory, but incurred by individual territories. For instance, if the territorial salesmen are provided with assistants, part or all of whose salaries are assumed by the agency, such payments are readily apportioned, the salary of each assistant being charged to the territory in which he operates. You will note that in columns No. 4 and No. 8 no assistants are operated, or else the senior salesman's remuneration is on a basis providing that he pay the entire salary of his assistants.

Having, in the first section, taken care of all direct expense incurred by the individual territory, all other general selling expense is shown in the second section.

Office expense may be similarly divided into a direct and a general section provided any items belong to certain territories only. In our illustration, we will, however, treat all office expense as direct, to avoid going into too great detail in the time we have available.

The general expense shown in the second and third sections is pro-rated against the various territories by multiplying the total expense by the territorial percentage of total quota.

Adding the first and second sections together in all columns, we have the selling expense of the agency divided properly into territories.

The third section takes care of all other overhead.

The plan contemplates division into any other sections or classifications that may be desirable, according to the nature of the product or selling plan.

The form, when complete, should absorb every expenditure of any kind, that falls upon the agency.

If used by the company, it would absorb every expenditure of any kind not included in manufacturing cost.

In utilizing this form, it will, of course, require considerable revision as to the selection of expense items, and their proper place as a direct or general statistical charge.

We shall now assume that we have determined the proper distribution of all expenses. Having done this, the next thing to do is to *use* the information.

Chart II is entitled "Territorial Income and Expense," and also shows territorial profit or loss.

The numbered columns represent existing territories. The lettered columns cover adjustments required in the accounts of former representatives no longer employed.

TERRITORIAL INCOME & EXPENSE

November		Salesmen									Former Salesmen		
	Total	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	A	B	C
Month Quota	1145	117	122	117	104	162	149	140	177	177			
Points Sold	963	214	121	83	22	63	99	213	54	103	(9)		
Value Sold	24195.66	5359.75	3074.	2075.08	560.	1598.	2526.	5305.	1337.83	2598.	(228)		
Gross Profit	7010.09	1622.93	916.35	531.97	136.50	479.40	684.30	1534.50	391.19	779.40	68.40	(15)	16.95
Salesmen's Com.	3523.58	1078.35	455.48	263.30	77.25	316.	449.	255.75	250.40	419.75	(34.20)	(7.50)	
Balance	3486.51	544.58	460.87	268.67	59.25	163.40	235.30	1278.75	140.79	359.65	(34.20)	(7.50)	16.95
Salaries Paid	200.							200.					
Total Revenue	3286.51	544.58	460.87	268.67	59.25	163.40	235.30	1078.75	140.79	359.65	(34.20)	(7.50)	16.95
Office Expense	1017.26	103.76	108.85	103.76	92.57	144.45	132.25	124.10	103.76	103.76			
Selling Expense	1050.92	115.36	142.81	131.59	43.40	111.53	119.53	247.98	48.59	90.13			
Total Expense	2068.18	219.12	251.66	235.35	135.97	255.98	251.78	372.08	152.35	193.89			
Net Earned	1218.33	325.46	209.21	33.32	(76.72)	(92.58)	(16.48)	706.67	(11.56)	165.76	(34.20)	(7.50)	16.95
Year to Nov. 1	13866.34	881.70	(294.65)	2624.88	836.16	425.07	(160.10)	7361.11	(85.04)	149.18	415.70	1049.08	664.25
Year to Nov. 30	15084.67	1207.16	(85.44)	2658.20	759.44	332.49	(177.58)	8067.78	(96.60)	314.94	381.50	1041.58	681.20

Note: Figures in parentheses are red-ink figures.

Chart II. Territorial Income and Expense.

The total column must agree with the books.

The "month's quota," "points sold," and "value sold" are matters of record, easy to obtain.

The same is true of the "gross profit," commission credited to the territory, and salaries paid. You therefore have no difficulty in getting the territorial "total revenue." If the commission credited, bonus credited, and salary paid, are less than the gross profit, the territory will show a profit; otherwise a loss.

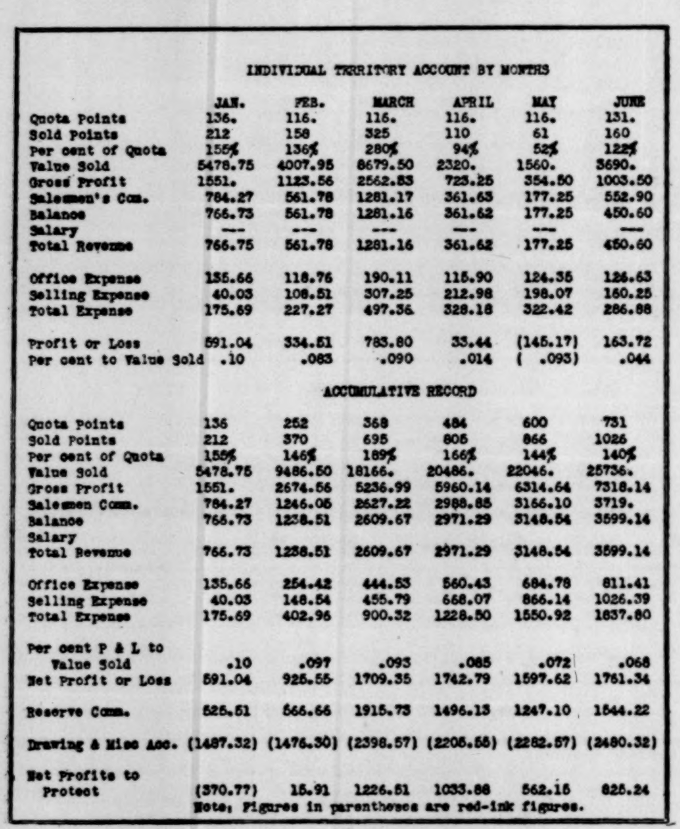
There are many concerns that stop right here, and form conclusions accordingly.

Introducing our distribution of expense as shown in Chart I, we are able to produce information of considerable additional value.

Deducting these expenses all across the line, we arrive at the *real net earnings* of each territory and locate our real red and black balances.

Of course we do not judge the territory by a single month's performance, so we show the "year to date," or six or twelve, or any other desired number of months' record, and our final totals give us a real comparison of utmost value.

Chart III shows a comparison of results by months for an individual territory. A sheet of this kind should be kept for each territory.



INDIVIDUAL TERRITORY ACCOUNT BY MONTHS

	JAN.	FEB.	MARCH	APRIL	MAY	JUNE
Quota Points	136.	116.	116.	116.	116.	131.
Sold Points	212	158	325	110	61	160
Per cent of Quota	155%	136%	280%	94%	52%	122%
Value Sold	5478.75	4007.95	8679.50	2320.	1560.	3690.
Gross Profit	1551.	1123.56	2562.83	723.25	354.50	1003.50
Salesmen's Com.	784.27	561.78	1281.17	361.63	177.25	552.90
Balance	766.73	561.78	1281.16	361.62	177.25	450.60
Salary	---	---	---	---	---	---
Total Revenue	766.75	561.78	1281.16	361.62	177.25	450.60
Office Expense	135.66	118.76	190.11	115.90	124.35	126.63
Selling Expense	40.03	108.51	307.25	212.98	198.07	160.25
Total Expense	175.69	227.27	497.36	328.18	322.42	286.88
Profit or Loss	591.04	334.51	783.80	33.44	(145.17)	163.72
Per cent to Value Sold	.10	.083	.090	.014	(.093)	.044
ACCUMULATIVE RECORD						
Quota Points	136	252	368	484	600	731
Sold Points	212	370	695	805	866	1026
Per cent of Quota	155%	146%	189%	166%	144%	140%
Value Sold	5478.75	9486.50	18166.	20486.	22046.	25736.
Gross Profit	1551.	2674.56	5236.99	5960.14	6314.64	7318.14
Salesmen Comm.	784.27	1246.06	2627.22	2988.85	3166.10	3719.
Balance	766.73	1238.51	2609.67	2971.29	3148.54	3599.14
Salary						
Total Revenue	766.73	1238.51	2609.67	2971.29	3148.54	3599.14
Office Expense	135.66	254.42	444.53	560.43	684.78	811.41
Selling Expense	40.03	148.54	455.79	668.07	866.14	1026.39
Total Expense	175.69	402.96	900.32	1228.50	1550.92	1837.80
Per cent P & L to Value Sold	.10	.097	.093	.085	.072	.068
Net Profit or Loss	591.04	925.55	1709.35	1742.79	1597.62	1761.34
Reserve Comm.	525.51	566.66	1915.73	1496.13	1247.10	1544.22
Drawing & Misc Acc.	(1487.32)	(1476.30)	(2398.57)	(2205.55)	(2282.57)	(2480.32)
Net Profits to Protect	(370.77)	15.91	1226.51	1033.88	562.15	825.24

Note; Figures in parentheses are red-ink figures.

Chart III. Individual Territory Account.

The upper part of the sheet contains the record of each month and should be wide enough to cover twelve months.

The lower part is an accumulative record of great value.

Looking across the "per cent of quota" line, we ascertain the "tendency." In the illustration, there is a steady decrease after the third month.

The line "net profit or loss" shows no appreciable gain after the third month.

The line "per cent of profit to value sold" shows a steady downward tendency from the start.

Such indications are most significant and point their own moral.

It is not enough, however, to determine net territorial profit or loss.

I want to know whether the profit shown is protected or partly dissipated by excessive drawing and expense accounts.

Assuming that we have a practical and fair "commission reserve" policy, we are able to enter at the end of this form, from our books as they stand on the last day of the month, the territorial "reserve" and the state of the territorial drawing account.

At the end of January the profit has all gone to the salesman and more. The territorial "profit" is an actual deficit. In February, the net profit is without protection. In March, a protected profit is shown, but is less than the profit earned. The figures shown are used to illustrate how an excessive drawing account can readily dissipate fancied profits, and how *exact figures* portray the all-important *tendency*.

Chart IV is a comparison of territories for a considerable period. Some of the columns cover partial periods only, due to personnel changes.

A "total" column for proof purposes, and an "average" column, can also be used.

Note that the net profits in territories 1, 3, 4, 5, 7 and 9 are fully protected. Territories 2 and 6 show profits not sufficiently protected. Territories 8, 10 and 11 are in bad shape and can be rescued only by reducing or cutting out the drawing account and paying part commission as new business is brought in, the balance gradually reducing the evident loss. These figures are exaggerated, but a condition like this may arise if records such as these are not kept.

If such records are kept, corrective measures are possible at a much earlier date than otherwise.

A territorial comparison like this shows where to "operate," but the operation must be made soon enough to save the patient many long hours of illness that might be prevented.

In closing let me say that records like these are also of great value when corrective measures are to be taken, because they are "cards" that can be "laid on the table." They can help to apply remedies without friction, and with real understanding of the necessities of the case.

These charts are made up from no printed form. These exact forms are not in print. They are suggestive only.

What I have told you this afternoon is no stereotyped process. What I have shown you is the product of actual personal experience, and as such is offered to you for just what it may be worth to you. If you find something in it that you can use, I shall be glad.

(Following this paper, Mr. Staubach answered questions for an hour or more on the charts, their application in various directions and on the quota subject as a whole. The session was one of keen interest and evident appreciation.)

ACCUMULATIVE TERRITORY COMPARISONS

	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	No. 11
Points Quota	632	2094	991	2154	1586	827	2404	691	292	1614	2017
Points Sold	678	2153	536	2867	1522	554	2064	388	245	839	1042
Per cent of Quota	107%	102%	54%	133%			85%	56%		53%	51%
Value Sold	17061.38	54228.77	13859.83	71845.08	37909.28	14677.75	52217.34	9984.09	6411.35	21113.	26828.42
Gross Profit	4873.62	15658.39	4058.49	21332.82	10926.15	4227.27	15199.29	2956.73	1758.91	6000.	7858.62
Salesmen Comm.	2436.82	8158.15	2205.33	14148.13	6739.61	1611.08	9996.89	1125.74	1172.60	3952.60	3723.96
Balance	2436.80	7500.24	1853.16	7084.69	4186.54	2616.19	5202.40	1830.99	586.31	2047.80	4134.66
Salary						315.		585.			1020.
Total Revenue	2436.80	7500.24	1853.16	7084.69	4186.54	2301.19	5202.40	1245.99	586.31	2047.80	3114.66
Office Expense	720.34	2054.57	840.45	2129.57	1669.08	927.75	2352.65	622.37	293.51	1536.88	2021.31
Selling Expense	674.88	2327.44	388.65	2022.06	1106.06	1018.94	1743.85	433.09	182.05	883.60	2293.06
Total Expense	1395.22	4382.01	1229.10	4151.63	2775.14	1946.69	4096.50	1055.46	475.57	2420.48	4314.37
Per cent P or L to Value Sold	.061	.057	.045	.0408	.037	.024	.021	.019	.017	(.018)	(.044)
Net P or L	1041.58	3118.23	624.06	2933.06	1411.40	354.50	1105.90	190.53	110.74	(372.68)	(1199.71)
Reserve Comm.	28.81	983.84	542.91	864.49	905.83	95.16	1269.68	232.48	26.94	840.86	332.29
Draw & Misc Acc.	(8.59)	(2178.17)			(883.97)	(416.05)		(870.13)		(2357.65)	(2414.29)
Net to protect profit	1061.80	1923.90	1166.97	3797.55	1433.26	33.61	2375.58	(447.12)	137.68	(1516.79)	(2082.00)
	X		X			X			X		

X Partial Period. Note: Figures in parentheses are red-ink figures.

Chart IV. Accumulative Territory Comparisons.

DISCUSSION

H. R. Wellman[1] (Chairman's opening remarks): Before discussing the subject assigned for the afternoon conference, perhaps it would be well to clarify some apparent misunderstandings regarding the application of scientific management to sales planning or to sales engineering, if you please.

In all the discussions up to this point, it has seemed advisable to dwell particularly upon the method and technique of the planning rather than upon practical example or practical application. This has seemed to be necessary, due to the fact that the study itself is, of course, in its infancy. The practical application is being approached through a study of the general

However, I am quite sure that I am representing the Taylor Society when I make the unqualified statement that the Taylor Society itself recognizes the fact that none of these suggested changes should be put into operation until they have been fully explained to the sales people and other people concerned, and until a general acceptance of the plan is secured from those about to operate it. In other words, while no particular mention of this fact has been made, and while perhaps it has been a fair criticism to state that too much time has been devoted to technique and methods, it has been clearly in the minds of the committee interested in this subject, that the first move in attempting the installing of any methods of this kind must involve whole-hearted acceptance by the people involved.

We have been told that production can no longer furnish the necessary economies to bring about the necessary reduction in prices to meet competition. We have been told that of all the unorganized, wasteful, extravagant, and generally useless branches of business, sales occupied the front seat. The lamentable part of it is, the statement itself is fairly accurate. However, in situations of this sort it is particularly pleasing to produce as a witness for the defense, a man and a business whose house has been put in order for a great many years, whose use of the quota and intelligent planning methods for sales and salesmen has been a landmark for the last ten years at least. Mr. Staubach, after his thorough and practical demonstration of the Quota System at Springfield, needs no further introduction to this meeting. Today he will go a little more into the detail of keeping records for profitable selling. In other words, he will reduce the intangible quota to the tangible quota, and deal not only with the work of the salesmen, but the profitableness of salesmen to the local branch.

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[1] Professor of Marketing, Amos Tuck School, Dartmouth College, Hanover, N. H.

E. St. Elmo Lewis[1]: Mr. Staubach has made a very interesting addition to his other two notable contributions to the subject of quota, and these reports in themselves will be well worth the entire price of membership in the Taylor Society to any American sales manager.

There is one thing that I should like to add to Mr. Staubach's statement about the development of the basis for quota. I think I joined the Burroughs Adding Machine Company, with which Mr. Staubach is connected, about the time Mr. Staubach joined it in 1904, and all through the intervening years, the Burroughs Adding Machine Company has been developing its quota system, analyzing territories, and digging for the facts upon which it now bases its quota; and each year has seen it a little more accurate, therefore more fair to the men and more productive of results.

I hope that the time will come within the next few sessions of this section of the Society, when we shall take the quota as a basis for advertising activities, formulating the principles upon which advertising shall in its turn, be controlled by those fundamental conditions that now control the selling activity, the charging of overhead, etc. As a man interested in the advertising business, I have always contended that advertising and selling, as Mr. Hugh Chalmers once said, are the husband and wife in distribution. They are inseparable and one is necessary to the other. They must be formulated on the same basis. There have been several significant changes developing within the past few years.

For one thing, the advertising agents, of which my company is a part, are no longer concerned solely with the selection of publications on a circulation basis, and the preparation of clever designs and clever copy, but they are making those intensive market researches which are the very essence of Mr. Staubach's message, for the purpose of deciding what is the kind of a message that should be written in order that it may help to *sell goods,* and I would emphasize that the advertising that doesn't help sell goods is not advertising, and that the advertising agency that doesn't recognize that fundamental principle in its work, and has not something more tangible to deliver to its client than general publicity—with all the crimes that are committed in its name—is failing to realize the economic necessity which now confronts business.

I am sorry that a representative of every advertising agency is not here. I am sorry that there are not more advertising managers present, because advertising needs just such viewpoint and material as are presented in Mr. Staubach's talk. The more advanced agencies are recognizing it, but they will not go far unless the general executives, the sales managers, and the advertising managers recognize that every dollar of expenditure must somewhere meet the supreme test of the *net* results, and that in the final analysis, the sales side of business must be able to justify its expenditures on something more definite than "general results." Just as the financiers forced the adoption of adequate accounting methods, and the discoveries of the cost accountants forced the adoption of scientific production methods, the same attitude of mind, expressed in rigorous thought, is going to force more consideration for the fundamentals of the whole distribution side of business. When it does come—as it will come—it will be because economic necessity is forcing it, and it will be the best thing that ever happened in distribution.

D. F. Hoskins:[1] In every sales proposition one of the most fundamental and difficult problems to solve is the determination of the correct territory to be covered by the average salesman, so as to produce maximum business at minimum expense. The territory which is too large is just as serious a handicap as the territory which is too small. The average salesman usually looks with envious eyes on the other fellow's territory and goes on the mistaken assumption that the larger his territory, the larger his sales will be. The fundamental idea, as far as sales possibilities are concerned, is that the salesman should fit the territory and not that the territory should be made to fit the salesman.

Every sales organization, I believe, must be considered on a basis of operating the average salesman, this being determined on a basis of total volume divided by number of salesmen, which will be the average volume of each salesman's sales. Taking the individual sales of each salesman, it will be found that the organization is divided into three classes; a few above the average, a great number on the average, and a few below the average. Therefore, in considering salesmen to fit the territory, we must think of the average salesman and not of the fellow below the line or the fellow above the line.

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[1] Vice-President and Manager, Campbell-Ewald Co., New York.

[1] Manager Sales Promotion, Hood Rubber Products Company, Watertown, Mass.

In every sales proposition in a given sales territory, the average salesman traveling on the proper basis can make just so many calls in a given time, and these calls must be made to cover the entire territory at necessary intervals so as to result in getting maximum business at minimum expense. The territory which is too large results in loss of business through the inability of the salesman to cover each dealer at proper intervals. A territory that is too small will naturally produce all the business possible, but, on the other hand, results in an excessive sales expense required to get the business.

Therefore, it is evident that this major problem can only be answered for each territory by careful, scientific study of the market involved, so as to arrive at a determination of sales possibilities based on population, number of dealer outlets, radius of operating from the central point, method of traveling, whether by railroad or automobile, amount of distribution and volume of competition, and many other factors of lesser importance.

One fundamental, I think, in arranging contiguous territories within the major sales area, is that the territories so arranged should contain approximately equal sales possibilities divided into yearly quotas based on unit of sales which can be translated into dollars and cents value. In this way there are no cream territories and no pet salesmen, so that each average salesman has about the same possibilities.

The problem of operating territories under the fundamentals mentioned is one that cannot be settled by sitting down before a map and marking off sections on a purely mathematical basis. The sales manager should make, or have made by competent assistants, a survey of the major sales areas and endeavor to compile some practical data, which represent the facts and conditions as they exist. This examination on the part of the management would undoubtedly occupy a fairly long period of time, and would embrace, in carrying out the conclusions reached by scientific study, a series of territorial changes, the object of which would be to reach the ideal individual territory; so that when this point has been reached the territory can be operated as set, with the knowledge that it will produce maximum business at minimum expense, being operated by the average salesman.

In undeveloped major sales areas this point can be reached by what I would term, "progressive territory division;" and by this I mean that it is some times impossible, due to excessive immediate expense, to operate an undeveloped territory and cover it with sufficient salesmen. The other way out is to place a salesman on such an area with the understanding that it is not his territory, but a section in which he is to sell as directed. When the first salesman has arrived at the point where it is evident that two salesmen can get double the business, the major sales area is divided into halves and two salesmen cover it. Subsequently, it will be determined that four salesmen can cover the major sales area and get double the business that the two men had secured. In this way, at the end of the progressive division of territory, each man will be securing as much business as the man first put on to cover the entire major sales area; and from this point on the individual territories will be operated and the territory considered as having reached its ultimate stage of development.

There are many businesses that would show considerably more net profit if they should sell less goods and travel less salesmen and give up unproductive territories which, because of the sales possibilities, never will be able to produce sufficient business to warrant the expense to cover them. On the other hand, there are undoubtedly many concerns that could do a larger business at a satisfactory rate of profit if they had more territories and more salesmen. This seems to indicate that the matter of having the correct number of logical territories covered by the average salesman is a big question, and one which from a sales engineering standpoint can well occupy a very large measure of the sales manager's attention in attempting to solve some of the fundamental problems of practical and scientific sales management.

In carrying out such scientific sales management and engineering, I would sound a note of warning that we must not forget that the element of human nature involved in the solution of this problem is one which must be considered very carefully. As the management functions on a scientific basis, the best results can be secured only by laying the facts as they are discovered before the sales force and other operating units, so that they fully comprehend the purpose of the moves as made and are sold on the policy of the management.

The object of such management—the good of the business—can be shown to be also the increased earning capacity of each salesman.

A FOOTNOTE TO MUTUAL RATING[1]

AN ANECDOTE FROM A SUMMER CAMP

By Henry Wood Shelton[2]

"HOW can we get the girls really interested in the condition of their tents?" was a question put to me this summer by the director of a newly established camp for girls.

"Just what sort of condition do you mean?" I asked.

"We want each girl," she replied, "to feel a sense of responsibility for her section of her tent, as well as to cooperate with her tent-mates in keeping the tent as a whole neat and clean. The girls make their own beds, and although the ideal is standard hospital practice of smooth top and square corner, and we have a trained nurse to show them how, they are not interested in making the necessary effort.

"Each girl has one of a set of five shelves for her own toilet articles and other special use. The bottom shelf is reserved for shoes. She also shares the high swinging shelf which runs the length of the tent, and on which sweaters, rain-coats, ponchos and the like are to be neatly piled. Trunks and bags go under the beds or wherever the tent-mates choose. The problem is how to get the girls really interested in keeping all these belongings neat and shipshape."

"How are you handling it now?"

"Each morning some councillor whom I appoint inspects all the tents, and grades each "A," "B," or "C," according to its condition. I thought that the desire to have a high grading would stimulate the girls to take an interest, but only a few really take hold. Some of them seem utterly indifferent, and are a real problem to the councillors. You know one councillor lives in each tent with three girls."

"Have you thought of putting the responsibility not only for the condition of the tents, but for judging that condition, on the girls?" I asked. "Mutual ratings would enable them to get a collective impersonal judgment in a way which might arouse the interest you want."

Then I explained briefly the underlying principles and general method of mutual ratings, and the director decided to see whether they would appeal to the girls.

Every Sunday evening, just after an open-air supper, a camp meeting was held to discuss matters of general camp interest and policy, and at the next meeting mutual ratings were presented. The result was a unanimous vote by the girls to try it out. The plan adopted was twofold; first a mutual rating of the occupants of each tent by each other, and second, a rating of all the tents by a representative committee.

From the time mutual ratings started the attitude of almost every one in camp was revolutionized. "Assembly" came at 9.15 A.M., and every camper was required to be present. The time between breakfast and assembly was the only regular time for the tent "chores." Instead of loitering and grudgingly returning to perform a disagreeable duty, the girls raced from breakfast to their tents, and vied with each other in the perfection of their bed-making, the orderliness of their shelves, and the cleanliness of the floors under and around their beds. The bugle for assembly ended all such effort, and at assembly ballots were passed around on which each camper rated the results achieved by all the occupants of her particular tent, herself included, putting the names down in 1, 2, 3 order, so that the person standing first scored one, and the person standing last scored four. In case of a tie of two or more the collective score of the two places was divided between them. For instance, if two girls tied for second and third place, each received two and a half points. If two were tied for first place each received one and a half points.

The persons ranking first in each tent as determined by the ballots cast at assembly constituted a representative inspection committee to act the following morning. Immediately after assembly the inspection committee of those standing first the previous day made the rounds of the tents, and individually graded them likewise in 1, 2, 3 order, noting on their ballots their specific points of criticism. The tabulation of these ballots determined the relative standing of all the tents for that day.

Charts were posted in the assembly room showing the standing of each tent each day, and the cumulative standing of each tent for the week. The tent having the best cumulative score for the week became the proud holder of the "Honor Tent" banner for the week following.

A chart was also posted recording for each individual camper the number of times she achieved first place in her tent. This was made cumulative for the season, at the end of which a special camp insignia was awarded the girl who had the best individual score.

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[1] Supplementing paper entitled "Mutual Rating," presented at a meeting of the Taylor Society, December 6, 1919, by Henry Wood Shelton. Published in *Bulletin of the Taylor Society*, Vol. 5, No. 2.

[2] Consulting Engineer in Management, Philadelphia.

As week-ends approached the competition between two tents almost tied for a particular place often became especially keen. When the inspection committee arrived the girls would challenge it to find anything wrong. Indeed the committee was often hard put to find anything to criticize. Some of their records showed that in one tent the only thing was a nail file not quite straight, in another a box with a cover not down tight, in another a trunk with one hasp up and one down. If a hair brush had three hairs in it, or the prongs of a comb were not perfectly clean it was marked down by the committee. If the heels of shoes on the bottom shelf were noticeably out of perfect alignment, or if the shoe tops flopped some one way and some the other, they were criticized. Of course, if the wash basins were not speckless, and the floor under the beds was not clean swept, these things too came in for censure. Once a comb which had not been thoroughly cleaned was hidden by a girl under her poncho on the swinging shelf. The keen eyes of a committee member in inspecting the shelf spied it, and that tent received last place that day because of the deception. As the personnel of the committee changed as often as there were changes in first place in the individual tents, the critical judgment of the whole camp was noticeably sharpened.

The cumulative score started fresh each week in order that no tent might be permanently handicapped and discouraged by a low score. The constantly shifting standing of the contestants, both individuals and tents, was a positive factor in the sustained interest.

Each week at the camp meeting the whole rating plan was brought up for review, criticism, and vote as to whether it should be abandoned or continued, and if continued, with what modifications. At these meetings the critical notes made by committee members were often read aloud for general information, and it was not long before some rather fundamental problems were brought out and settled. For instance, the question was raised as to which was more serious—lack of cleanliness, such as a dirty comb, or lack of order, such as a misplaced nail file. The unanimous verdict was that cleanliness was more important than orderliness.

After the first few weeks the tents became so uniformly excellent that some of the committee members felt it unnecessary for so many to make inspection rounds every day. This question was solved by a vote to have the committee reduced to three, composed of the ranking members of the tents, standing 1, 2 and 3 in the tent rating of the day before. This seemed to work satisfactorily to the end of the season.

Of course all was not smooth sailing. One of the councillors seemed to have a grudge against mutual ratings, and took every possible opportunity to discourage them. She even went so far as to discourage her own tent-mates from doing their best. Another member of the camp with long academic experience seemed to feel that mutual ratings were wrong in principle, not only because they appealed to the spirit of emulation, but because they set up each day a relative standing from top to bottom when all were so perfect that even those at the bottom would deserve an "A" grade according to college marking. The obvious attitude of these two, however, failed to dampen in any way the interest of the camp as a whole. They voted regularly and enthusiastically to continue the ratings right through the summer.

Visitors from other camps long familiar with camp conditions were amazed. "How do you do it?" they asked the director. When told that she didn't do it, but that it was done entirely by the campers themselves on their own initiative, their interest was keener than ever. The unanimous verdict of visitors was that never had they seen tents in such beautiful condition. They compared them with rooms at a military school, but with the great difference that this result was spontaneous, and not achieved by external compulsion and "discipline."

The son of the director was about to enter Harvard this Fall. He, with the swimming director and another young man, had their sleeping quarters in the converted hay loft of "the barn." Early in the season the director spent nearly half a day trying to establish a semblance of order and cleanliness in the boys' quarters. It seemed an almost hopeless task, because of the accumulated dust on the rafters, and the natural indifference of the occupants to such conditions. Within two weeks of the starting of mutual ratings, however, "the barn" rose from last to first place, and won the "honor tent" banner. They had made their quarters spotless, had learned to make beds with smooth tops and square corners, and even went so far as to get old tin cans and crocks, hand-decorate them in the crafts shop, and place them in effective locations full of wild flowers and ferns. The director said toward the end of the summer that the change in her son was almost unbelievable. His whole boarding school experience had failed to teach him to care for his own things in orderly fashion, and she had looked